INTERSTATER

FLAIL MOWER

Published 02/11 Part No. 803213C

OPERATOR'S MANUAL

This Operator's Manual is an integral part of the safe operation of this machine and must be maintained with the unit at all times. READ, UNDERSTAND, and FOLLOW the Safety and Operation Instructions contained in this manual before operating the equipment. *C01-Cover*

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¡ATENCIÓN!
LEA EL INSTRUCTIVO
Si No Lee Ingles, Pida Ayuda a Alguien Que Se Lo Lea Para Que le Traduzca Las Medidas de Seguridad

MEMBER OF THE ALAMO GROUP
ALWAYS ON THE CUTTING EDGE®

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To the Owner/Operator/Dealer

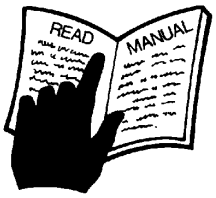
All implements with moving parts are potentially hazardous. There is no substitute for a cautious, safe-minded operator who recognizes the potential hazards and follows reasonable safety practices. The manufacturer has designed this implement to be used with all its safety equipment properly attached to minimize the chance of accidents.

BEFORE YOU START!!Read the safety messages on the implement and shown in your manual. Observe the rules of safety and common sense!

⚠ DANGER

FAILING TO FOLLOW SAFETY MESSAGES AND OPERATING INSTURCTIONS CAN CAUSE SERIOUS BODILY INJURY OR EVEN DEATH TO OPERATOR AND OTHERS IN THE AREA.

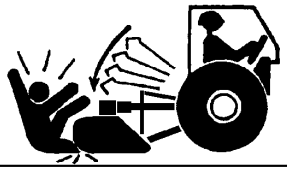
1.



2. NO RIDERS, NO CHILDREN OPERATORS

3. USE SAFETY SHOES, HARD HAT, SAFETY GLASSES, SEAT BELTS, & ROPS

4. BLOCK UP SECURELY BEFORE WORKING UNDER.



1. Study and understand Operator's Manuals, Safety Signs, and Instructional Decals for tractor & flail mower to prevent misuse, abuse, & accidents. Practice before operating mower in a confined area or near passersby.

- Learn how to stop engine suddenly in an emergency. Be alert for passersby and especially children.

2. Allow no children on or near implement or tractor. Allow no riders on tractor or implement. Falling off can cause serious injury or death from being runover by tractor or mower or contact with Flail Mower Blades.

3. Operate only with tractor having Roll-Over Protective Structure (ROPS) and with seatbelt fastened securely and snugly to prevent injury and possible death from falling off or tractor overturn. Personal Protective Equipment such as Hard Hat, Safety Glasses, Safety Shoes, and Ear Plugs are recommended.

4. Block up or support raised machine and all lifted components securely before putting hands or feet under or working underneath any lifted component to prevent crushing injury or death from sudden dropping or inadvertent operation of controls. Make certain that area is clear before lowering or folding.

5. Before transporting, put Lift Lever in detent or full-lift position. Install Transport Safety Devices securely on folding implements. Slow down when turning and on hillsides.

- Install Restrictor in folding circuit to slow down lowering and unfolding if action is faster than is desirable.

6. Make certain that SMV sign, Warning Lights, and Reflectors are clearly visible. Follow local traffic codes.

7. Never operate with Flail Mower or Folding Section raised if passersby, bystanders or traffic are in the area to reduce possibility of injury or death from objects thrown by Blades under Shields or implement structure.

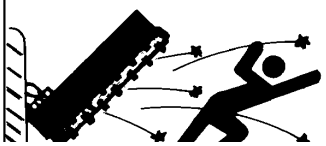
8. Before dismounting, secure flail mower in transport position or lower to ground.

- Put tractor in park position or set brake, disengage PTO, stop engine, remove key, and wait until noise of rotation has ceased to prevent entanglement in rotating parts which may cause injury or death.
- Never mount or dismount a moving vehicle. Crushing from runover may cause injury or death.

5. TRANSPORT SAFELY, LOCK UP.

6. USE SMV, LIGHTS, & REFLECTORS.

7. DO NOT OPERATE WITH MOWER OR WING RAISED.



8. DO NOT MOUNT OR DISMOUNT WHILE MOVING.

WARRANTY INFORMATION:

Read and understand the complete Warranty Statement found in this Manual. Fill out the Warranty Registration Form in full and return it to within 30 Days. Make certain the Serial Number of the Machine is recorded on the Warranty Card and on the Warranty Form that you retain.

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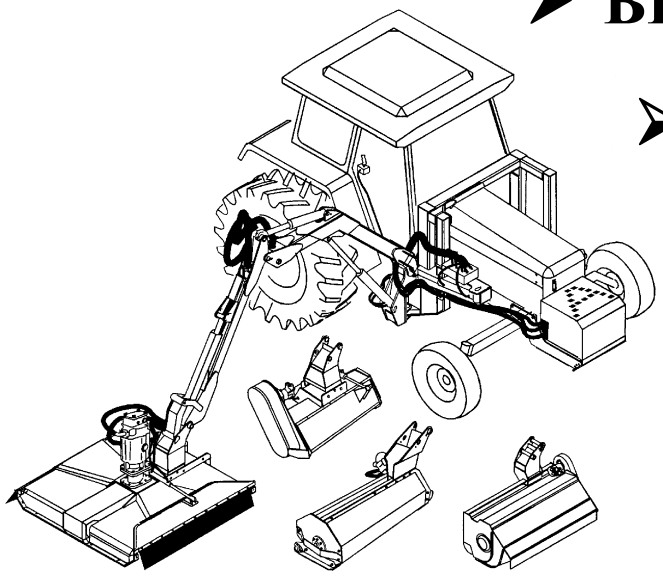

➢ BE SAFE!

➢ BE ALERT!

➢ BE ALIVE!

➢ BE TRAINED
before operating the Mower!

ALAMO INDUSTRIAL

Safety Training Makes the Difference

In order to reduce accidents and enhance the safe operation of mowers, *Alamo Industrial,* in cooperation with other industry manufacturers has developed the AEM/FEMA Industrial and Agricultural Mower Safety Practices video and guide book.

The video will familiarize and instruct mower-tractor operators in safe practices when using industrial and agricultural mowing equipment. It is important that Every Mower Operator be educated in the operation of their mowing equipment and be able to recognize the potential hazards that can occur while operating a mower. This video, along with the mower operator's manual and the warning messages on the mower, will significantly assist in this important education.

Your Authorized *Alamo Industrial* Dealer may have shown this video and presented you a DVD Video when you purchased your mower. If you or any mower operator have not seen this video, **Watch** the **Video, Read** this **Operator's Manual,** and **Complete** the **Video Guidebook** before operating your new mower. If you do not understand any of the instructions included in the video or operator's manual or if you have any questions concerning safety of operation, contact your supervisor, dealer or *Alamo Industrial*.

If you would like a VHS video tape of the video, please email AEMVideo@alamo-group.com or Fax AEM VHS Video at (830) 372-9529 or mail in a completed copy of the form on the back of this page to AEM VHS Video 1502 E Walnut Street, Seguin, TX 78155. and request the VHS video version. Please include your name, mailing address, mower model and serial number.

Every operator should be trained for each piece of equipment (Tractor and Mower), understand the intended use, and the potential hazards before operating the equipment.

Alamo Industrial Division is willing to provide one (1) AEM Mower Safety Practices Video

Please Send Me: ☐ VHS Format – AEM/FEMA Mower Operator Safety Video

☐ DVD Format – AEM/FEMA Mower Operator Safety Video

☐ Mower Operator's Manual

☐ AEM Mower Operator's Safety Manual

Requester Name _____ Phone: _____

Requester Address: _____

City _____

State _____

Zip Code _____

Mower Model: _____ Serial Number: _____

Date Purchased: _____ Dealer Salesperson: _____

Dealership Name: _____ Dealership Location: _____

Mail to:

AEM Video Services

1502 E Walnut street

Seguin, TX 78155

Or Fax to:

(830) 372-9529

Or Email to:

AEMVideo@alamo-group.com

SAFETY SECTION

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SAFETY

General Safety Instructions and Practices

A careful operator is the best operator. Safety is of primary importance to the manufacturer and should be to the owner/operator. Most accidents can be avoided by being aware of your equipment, your surroundings, and observing certain precautions. The first section of this manual includes a list of Safety Messages that, if followed, will help protect the operator and bystanders from injury or death. Read and understand these Safety Messages before assembling, operating or servicing this Implement. This equipment should only be operated by those persons who have read the manual, who are responsible and trained, and who know how to do so responsibly.

The Safety Alert Symbol combined with a Signal Word, as seen below, is used throughout this manual and on decals which are attached to the equipment. The Safety Alert Symbol means: “ATTENTION! BECOME ALERT! YOUR SAFETY IS INVOLVED!” The Symbol and Signal Word are intended to warn the owner/operator of impending hazards and the degree of possible injury faced when operating this equipment.

Practice all usual and customary safe working precautions and above all---remember safety is up to YOU. Only YOU can prevent serious injury or death from unsafe practices.

DANGER Indicates an imminently hazardous situation that, if not avoided, WILL result in DEATH OR VERY SERIOUS INJURY.

WARNING Indicates an imminently hazardous situation that, if not avoided, COULD result in DEATH OR SERIOUS INJURY.

CAUTION Indicates an imminently hazardous situation that, if not avoided, MAY result in MINOR INJURY.

Important Identifies special instructions or procedures that, if not strictly observed, could result in damage to, or destruction of the machine, attachments or the environment.

NOTE: *Identifies points of particular interest for more efficient and convenient operation or repair.* (SG-1)

READ, UNDERSTAND, and FOLLOW the following Safety Messages. Serious injury or death may occur unless care is taken to follow the warnings and instructions stated in the Safety Messages. Always use good common sense to avoid hazards. (SG-2)

PELIGRO Si no lee ingles, pida ayuda a alguien que si lo lea para que le traduzca las medidas de seguridad. (SG-3)

Operator Safety Instructions and Practices

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SAFETY

⚠WARNING The rotating parts of this machine continue to rotate even after the PTO has been turned off. The operator should remain in the operator's seat for 60 seconds after the brake has been set, the PTO disengaged, the tractor turned off, and all evidence of rotation has ceased. (S3PT-10)

"Wait a minute...Save a life!"

⚠ DANGER Never crawl under a raised Implement supported solely by the Tractor 3-Point hitch. Release of the control lever or mechanical failure will result in the Implement falling and possible injury or death. Always securely block up the Implement before crawling underneath to perform repairs and service. (S3PT-19)

⚠ DANGER Do not put hands or feet under mower decks. Blade Contact can result in serious injury or even death. Stay away until all motion has stopped and the decks are securely blocked up. (SFL-2)

⚠ DANGER Never operate the Tractor or Implement until you have read and completely understand this Manual, the Tractor Operator's Manual, and each of the Safety Messages found in the Manual or on the Tractor and Implement. Learn how to stop the tractor engine suddenly in an emergency. Never allow inexperienced or untrained personnel to operate the Tractor or Implement without supervision. Make sure the operator has fully read and understood the manuals prior to operation. (SG-4)

⚠WARNING The operator and all support personnel should wear hard hats, safety shoes, safety glasses, and proper hearing protection at all times for protection from injury including injury from items that may be thrown by the equipment. (SG-16)

⚠ CAUTION PROLONGED EXPOSURE TO LOUD NOISE MAY CAUSE PERMANENT HEARING LOSS! Tractors with or without an Implement attached can often be noisy enough to cause permanent hearing loss. We recommend that you always wear hearing protection if the noise in the Operator's position exceeds 80db. Noise over 85db over an extended period of time will cause severe hearing loss. Noise over 90db adjacent to the Operator over an extended period of time will cause permanent or total hearing loss. ***NOTE:*** *Hearing loss from loud noise [from tractors, chain saws, radios, and other such sources close to the ear] is cumulative over a lifetime without hope of natural recovery.* (SG-I7)

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SAFETY

⚠WARNING Always read carefully and comply fully with the manufacturer's instructions when handling oil, solvents, cleansers, and any other chemical agent. (SG-22)

⚠ DANGER KEEP AWAY FROM ROTATING ELEMENTS to prevent entanglement and possible serious injury or death. (SG-24)

⚠ DANGER Never allow children to play on or around Tractor or Implement. Children can slip or fall off the Equipment and be injured or killed. Inadvertent contact with controls can cause the Implement to shift or fall crushing themselves or others. (SG-25)

⚠ DANGER DO NOT use drugs or alcohol immediately before or while operating the Tractor and Implement. Drugs and alcohol will affect an operator's alertness and coordination and therefore affect the operator's ability to operate the equipment safely. Before operating the Tractor or Implement, an operator on prescription or over-the-counter medication must consult a medical professional regarding any side effects of the medication that would hinder their ability to operate the Equipment safely. NEVER knowingly allow anyone to operate this equipment when their alertness or coordination is impaired. Serious injury or death to the operator or others could result if the operator is under the influence of drugs or alcohol. (SG-27)

⚠WARNING Prolonged operation may cause operator boredom and fatigue affecting safe operation. Take scheduled work breaks to help prevent these potentially impaired operating conditions. Never operate the Implement and Tractor in a fatigued or bored mental state which impairs proper and safe operation. (SG-32)

⚠WARNING Use extreme caution when getting onto the Implement to perform repairs, maintenance and when removing accumulated material. Only stand on solid flat surfaces to ensure good footing. Use a ladder or raised stand to access high spots which cannot be reached from ground level. Slipping and falling can cause serious injury or death. (SG-33)

⚠WARNING Avoid contact with hot surfaces including hydraulic oil tanks, pumps, motors, valves and hose connections. Relieve hydraulic pressure before performing maintenance or repairs. Use gloves and eye protection when servicing hot components. Contact with a hot surface or fluid can cause serious injury from burns or scalding. (SG-34)

⚠ DANGER DO NOT operate this Implement on a Tractor that is not properly maintained. Should a mechanical or Tractor control failure occur while operating, immediately shut down the Tractor and perform repairs before resuming operation. Serious injury and possible death could occur from not maintaining this Implement and Tractor in good operating condition. (SG-36)

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Equipment Operation Safety Instructions and Practices

⚠WARNING Never leave the Tractor and Implement unattended while the Implement is in the lifted position. Accidental operation of lifting lever or a hydraulic failure may cause sudden drop of unit with injury or death by crushing. To properly park the implement when disconnecting it from the tractor, lower the stand and put the retaining pin securely in place, or put a secure support under the A-Frame. Lower the implement carefully to the ground. Do not put hands or feet under lifted components. (S3PT-1)

⚠WARNING Use extreme care when lowering or unfolding the implement's wings. Make sure no bystanders are close by or underneath the wings. Allow ample clearance around the implement when folding or unfolding the wings. Use extreme caution around buildings or overhead power lines. (S3PT-05)

⚠ DANGER This Implement may be wider than the Tractor. Be careful when operating or transporting this equipment to prevent the Implement from running into or striking sign posts, guard rails, concrete abutments or other solid objects. Such an impact could cause the Implement and Tractor to pivot violently resulting in loss of steering control, serious injury, or even death. Never allow the Implement to contact obstacles. (S3PT-12)

⚠ DANGER There are obvious and hidden potential hazards in the operation of this Mower. REMEMBER! This machine is often operated in grass and in heavy weeds. The Blades of this Mower can throw objects if shields are not properly installed and maintained. Serious injury or even death may occur unless care is taken to insure the safety of the operator, bystanders, or passersby in the area. Do not operate this machine with anyone in the immediate area. Stop mowing if anyone is within 100 yards of the mower. (SFL-1)

⚠WARNING Do not operate Mower if excessive vibration exists. Shut down PTO and the Tractor engine. Inspect the Mower to determine the source of the vibration. If Mower blades are missing or damaged replace them immediately. Do not operate the mower until the blades have been replaced and the Mower operates smoothly. Operating the Mower with excessive vibration can result in component failure and broken objects to be thrown outward at very high velocities. To reduce the possibility of property damage, serious injury, or even death, never allow the Mower to be operated with blades missing. (SFL-4)

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SAFETY

⚠ DANGER Flail Mowers are capable under adverse conditions of throwing objects for great distances (300 feet or more) and causing serious injury or death. Follow safety messages carefully.

STOP MOWING IF PASSERSBY ARE WITHIN 300 FEET UNLESS:

-Front and Rear Deflectors, Chain Guards, or Bands are installed and in good, workable condition;

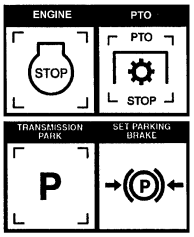
-Mower sections or Wings are running close to and parallel to the ground without exposed Blades;

-All areas have been thoroughly inspected and all foreign material such as rocks, cans, glass, and general debris has been removed.

NOTE: *Where there are grass and weeds high enough to hide debris that could be struck by the blades, the area should be: inspected and large debris removed, mowed at an intermediate height, inspected closely with any remaining debris being removed, and mowed again at desired final height. (This will also reduce power required to mow, reduce wear and tear on the Mower drivetrain, spread cut material better, eliminate streaking, and make the final cut more uniform.)* (SFL-6)

⚠ WARNING Operate this Equipment only with a Tractor equipped with an approved roll-over-protective system (ROPS). Always wear seat belts. Serious injury or even death could result from falling off the tractor--particularly during a turnover when the operator could be pinned under the ROPS. (SG-7)

⚠ DANGER BEFORE leaving the tractor seat lower the implement, set the parking brake and/or set the tractor transmission in parking gear, disengage the PTO, stop the engine, remove the key, and wait for all moving parts to stop. Place the tractor shift lever into a low range or parking gear to prevent the tractor from rolling. Never dismount a Tractor that is moving or while the engine is running. Operate the Tractor controls from the tractor seat only. (SG-9)



⚠ DANGER Never allow children or other persons to ride on the Tractor or Implement. Falling off can result in serious injury or death. (SG-10)

⚠ DANGER Never allow children to operate, ride on, or come close to the Tractor or Implement. Usually, 16-17 year-old children who are mature and responsible can operate the implement with adult supervision, if they have read and understand the Operator's Manuals, been trained in proper operation of the tractor and Implement, and are physically large enough to reach and operate the controls easily. (SG-11)

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⚠WARNING Do not mount or dismount the Tractor while the tractor is moving. Mount the Tractor only when the Tractor and all moving parts are completelystopped. (SG-12)

⚠ DANGER Start tractor only when properly seated in the Tractor seat. Starting a tractor in gear can result in injury or death. Read the Tractor operators manual for proper starting instructions. (SG-13)

⚠WARNING Do not operate this Equipment with hydraulic oil or fuel leaking. Oil and fuel are explosive and their presence could present a hazard. Do not check for leaks with your hand! High-pressure oil streams from breaks in the line could penetrate the skin and cause tissue damage including gangrene. To check for a hose leak, SHUT the unit ENGINE OFF and remove all hydraulic pressure. Wear oil impenetrable gloves, safety glasses and use Cardboard to check for evidence of oil leaks. If you suspect a leak, REMOVE the HOSE and have it tested at a Dealer. If oil does penetrate the skin, have the injury treated immediately by a physician knowledgeable and skilled in this procedure. (SG-15)

⚠ DANGER Never run the Tractor engine in a closed building or without adequate ventilation. The exhaust fumes can be hazardous to your health. (SG-23)

⚠WARNING Do not exceed the rated PTO speed for the Implement. Excessive PTO speeds can cause Implement driveline or blade failures resulting in serious injury or death. (SG-26)

⚠ DANGER Operate the Tractor and/or Implement controls only while properly seated in the Tractor seat with the seat belt securely fastened around you. Inadvertent movement of the Tractor or Implement may cause serious injury or death. (SG-29)

⚠WARNING In case of mechanical difficulty during operation, place the transmission in the park position, set the parking brake, shut down all power, including the PTO and the engine and remove the key. Wait until all rotating motion has stopped before dismounting. (SG-39)

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SAFETY

⚠WARNING Do Not operate this equipment in areas where insects such as bees may attack you and/or cause you to lose control of the equipment. If you must enter in such areas, use a tractor with an enclosed Cab and close the windows to prevent insects from entering. If a tractor cab is not available, wear suitable clothing including head, face, and hand protection to shield you from the insects. Attacking insects can cause you to lose control of the tractor, which can result in serious injury or death to you or bystanders. Never dismount a moving tractor. (SG-40)

⚠WARNING Mow only in conditions where you have clear visibility in daylight or with adequate artificial lighting. Never mow in darkness or foggy conditions where you cannot clearly see at least 300 feet (90 m) in front and to the sides of the tractor and mower. Make sure that you can clearly see and identify passersby, steep slopes, ditches, drop-offs, overhead obstructions, power lines, debris and foreign objects. If you are unable to clearly see these type of items discontinue mowing. (SGM-1)

⚠DANGER The rotating parts of this machine have been designed and tested for rugged use. However, the blades could fail upon impact with heavy, solid objects such as metal guard rails and concrete structures. Such impact could cause the broken objects to be thrown outward at very high velocities. To reduce the possibility of property damage, serious injury, or even death, never allow the cutting blades to contact such obstacles. (SGM-4)

⚠WARNING Extreme care should be taken when operating near loose objects such as gravel, rocks, wire, and other debris. Inspect the area before mowing. Foreign objects should be removed from the site to prevent machine damage and/or bodily injury or even death. Any objects that cannot be removed must be clearly marked and carefully avoided by the operator. Stop mowing immediately if blades strike a foreign object. Repair all damage and make certain rotor or blade carrier is balanced before resuming mowing. (SGM-05)

⚠WARNING Many varied objects, such as wire, cable, rope, or chains, can become entangled in the operating parts of the mower head. These items could then swing outside the housing at greater velocities than the blades. Such a situation is extremely hazardous and could result in serious injury or even death. Inspect the cutting area for such objects before mowing. Remove any like object from the site. Never allow the cutting blades to contact such items. (SGM-06)

⚠WARNING Mow at the speed that you can safely operate and control the tractor and mower. The correct mowing speed depends on terrain condition and grass type, density, and height of cut. Normal ground speed range is from 2 to 5 mph(3-8 kph). Use slow mowing speeds when operating on or near steep slopes, ditches, drop-offs, overhead obstructions, power lines, or when debris and foreign objects are to be avoided. (SGM-07)

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⚠WARNING Avoid mowing in reverse direction when possible. Check to make sure there are no persons behind the mower and use extreme care when mowing in reverse. Mow only at a slow ground speed where you can safely operate and control the tractor and mower. Never mow an area that you have not inspected and removed debris or foreign material. (SGM-08)

⚠WARNING Do not mow with two machines in the same area except with Cab tractors with the windows closed. (SGM-11)

⚠WARNING Follow these guidelines to reduce the risk of equipment and grass fires while operating, servicing, and repairing the Mower and Tractor:

-Equip the Tractor with a fire extinguisher in an accesible location.

-Do Not operate the Mower on a Tractor with an underframe exhaust.

-Do Not smoke or have an open flame near the Mower and Tractor.

-Do Not drive into burning debris or freshly burnt areas.

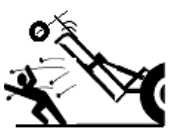
-Ensure slip clutches are properly adjusted to prevent excessive slippage and plate heating.

-Never allow clippings or debris to collect near drivelines, slip clutches, and gearboxes. Periodically shut down the Tractor and Mower and clean clippings and collected debris from the mower deck. (SGM-12)

⚠DANGER The Mower is designed for certain mowing applications and is rated to cut up to a specific size vegetation (see Mower Standard Equipment and Specifications). DO NOT use this mower to cut vegetation above the Mower's rated capacity or to cut any type of non-vegetative material. Only operate this Mower on a properly sized and equipped Tractor. Operating this Mower in an application for which it is not designed and/or operating the Mower with the wrong size Tractor can cause Mower component damage and equipment failure resulting in possible serious injury or death. (SGM-14)

⚠DANGER Do Not attempt to raise or lower the implement wing unless the Implement tongue is securely attached to the Tractor drawbar. The Implement could tip over and cause equipment damage and possible serious injury or death. Raise or Lower the mower wing only while seated in the Tractor operator's seat with the seat belt securely fastened. (SRM-2)

⚠WARNING Do not let the Blades turn when the Mower Deck is raised for any reason, including clearance or for turning. Raising the Mower deck exposes the Cutting Blades which creates a potentially serious hazard and could cause serious injury or even death from objects thrown from the Blades. (SRM-07)



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SAFETY

⚠ DANGER

DO NOT allow any person under a folded wing unless wing is securely locked up or supported. **DO NOT** approach the Implement unless the Tractor is turned off and all motion has ceased. Never work under the frame work, or any lifted component unless the implement is securely supported or blocked up. A sudden or inadvertent fall by any of these components could cause serious injury or even death. (STI-03)

Connecting or Disconnecting Implement Safety Instructions and Practices

⚠ DANGER

DO NOT use a PTO adapter to attach a non-matching Implement driveline to a Tractor PTO. Use of an adapter can double the operating speed of the Implement resulting in excessive vibration, thrown objects, and blade and implement failure. Adapter use will also change the working length of the driveline exposing unshielded driveline areas. Serious bodily injury and/or equipment failure can result from using a PTO adapter. Consult an authorized dealer for assistance if the Implement driveline does not match the Tractor PTO. (S3PT-14)

⚠ DANGER

Always shut the Tractor completely down, place the transmission in park, and set the parking brake before you or anyone else attempts to connect or disconnect the Implement and Tractor hitches. (S3PT-15)

⚠WARNING

Never operate the Tractor and Mower if the Implement input driveline is directly connected to the Tractor transmission. Tractor braking distances can be substantially increased by the momentum of the rotating Mower blades driving the Tractor transmission even though the Tractor clutch has been disengaged. Install an over running clutch between the Tractor PTO and the Mower driveline to prevent this potentially dangerous situation. (S3PT-16)

⚠WARNING

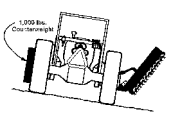
When attaching the Implement input driveline to the Tractor PTO, it is important that the connecting yoke spring activated locking collar slides freely and the locking balls are seated securely in the groove on the Tractor PTO shaft. Push and pull the driveline back and forth several times to ensure it is securely attached. A driveline not attached correctly to the Tractor PTO shaft could come loose and result in personal injury and damage to the Implement. (S3PT-17)

⚠WARNING

Before operating the Implement, check to make sure the Implement input driveline will not bottom out or become disengaged. Bottoming out occurs when the inner shaft penetrates the outer housing until the assembly becomes solid-it can shorten no more. Bottoming out can cause serious damage to the Tractor PTO by pushing the PTO into the Tractor and through the support bearings or downward onto the PTO shaft, breaking it off. A broken driveline can cause personal injury. (S3PT-18)

⚠WARNING

Each Rear Wheel must have a minimum of 1,000 pounds contact with the surface to prevent lateral instability and possible tip-over which could result in serious bodily injury or even death. Widen the wheel tread and add weights if needed. Refer to the mounting instructions or call customer service if you need assistance with counterweight procedure. (SFL-3)



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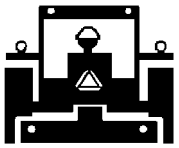
⚠ CAUTION On a fully-assembled unit, do not remove the Wing Retaining Strap until hoses are attached to the tractor and the Wing Cylinders are filled with oil. Lower the Wings slowly and carefully. Keep bystanders away during operations. (STI-05)

Transporting Safety Instructions and Practices

⚠WARNING Be particularly careful when transporting the Implement with the Tractor. Turn curves or go up hills only at a low speed and using a gradual steering angle. Rear mounted implements move the center of gravity to the rear and remove weight from the front wheels. Make certain, by adding front ballast, that at least 20% of the tractor's weight is on the front wheels to prevent rearing up, loss of steering control or Tractor tip-over. Slow down on rough or uneven surfaces to prevent loss of steering control which could result in property damage or possible injury. Do not transport unless 3-Point lift lever is fully raised and in the latched transport position. Dropping implement in transport can cause serious damage to the tractor and/or Implement and possibly cause the operator or others to be injured or killed. (S3PT-02)

⚠WARNING Allow sufficient clearance for the Implement to swing outward while turning. Implements carried behind the Tractor will swing outside the tire path when making turns. Contacting a solid object while turning will cause equipment damage and possible injury. (S3PT-20)

⚠WARNING Make certain that the "Slow Moving Vehicle" (SMV) sign is installed in such a way as to be clearly visible and legible. When transporting the Equipment use the Tractor flashing warning lights and follow all local traffic regulations. (SG-6)



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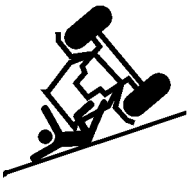
SAFETY

⚠WARNING Transport only at speeds where you can maintain control of the equipment. Serious accidents and injuries can result from operating this equipment at high speeds. Understand the Tractor and Implement and how it handles before transporting on streets and highways. Make sure the Tractor steering and brakes are in good condition and operate properly.

Before transporting the Tractor and Implement, determine the proper transport speeds for you and the equipment. Make sure you abide by the following rules:

Test the tractor at a slow speed and increase the speed slowly. Apply the Brakes smoothly to determine the stopping characteristics of the Tractor and Implement. As you increase the speed of the Tractor the stopping distance increases. Determine the maximum transport speed not to exceed 20 mph (30 kph) for transporting this equipment.

Test the equipment at a slow speed in turns. Increase the speed through the turn only after you determine that the equipment can be operated at a higher speed. Use extreme care and reduce your speed when turning sharply to prevent the tractor and implement from turning over. Determine the maximum turning speed for you and this equipment before operating on roads or uneven ground.



Only transport the Tractor and Implement at the speeds which allow you to properly control the equipment.

Be aware of the operating conditions. Do not operate the Tractor with weak or faulty brakes or worn tires. When operating down a hill or on wet or rain slick roads, the braking distance increases: use extreme care and reduce your speed. When operating in traffic always use the Tractor's flashing warning lights and reduce your speed. Be aware of traffic around you and watch out for the other guy. (SG-19)

⚠ DANGER When the Wings are folded for transport, the center of gravity is raised and the possibility of overturn is increased. Drive slowly and use extreme caution when turning on hillsides. Overturning the Implement could cause the Implement to overturn the Tractor and vice versa resulting in serious injury or even death. Never fold wings on a hillside...the Implement or unit may overturn. (STI-02)

⚠WARNING Only tow the Implement behind a properly sized and equipped Tractor which exceeds the weight of the Implement by at least 20%. DO NOT tow the Implement behind a truck or other type of vehicle. Never tow the Implement and another Implement connected in tandem. Never tow the Implement at speeds over 20 MPH. (STI-06)

⚠WARNING Secure the Implement for transport before traveling on public roads. For pull-type Implements, secure the center axle using cylinder stops or transport pin and properly attach a safety chain between the Implement and Tractor. Secure wings in upright position on folding Implements using wing transport locks. (STI-7)

Maintenance and Service Safety Instructions and Practices

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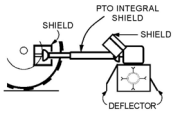
⚠ DANGER Make sure the PTO shield, integral driveline shields, and input shields are installed when using PTO-driven equipment. Always replace any shield if it is damaged or missing. (S3PT-8)

⚠ WARNING Relieve hydraulic pressure prior to doing any maintenance or repair work on the Implement. Place the Implement on the ground or securely blocked up, disengage the PTO, and turn off the tractor engine. Push and pull the Remote Cylinder lever in and out several times prior to starting any maintenance or repair work. (S3PT-09)

⚠ DANGER Always disconnect the main PTO Driveline from the Tractor before performing service on the Implement. Never work on the Implement with the tractor PTO driveline connected and running. Rotating Parts, Blades or Drivelines could turn without warning and cause immediate entanglement, injury or death. (S3PT-11)

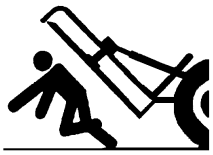
⚠ DANGER All Safety Shields, Guards and Safety devices including (but not limited to) - the Deflectors, Steel Guards, Gearbox Shields, PTO integral shields , and Retractable Door Shields should be used and maintained in good working condition. All safety devices should be inspected carefully at least daily for missing or broken components. Missing, broken, or worn items must be replaced at once to reduce the possibility of injury or death from thrown objects, entanglement, or blade contact. (SFL-5)



⚠ WARNING Always maintain the safety signs in good readable condition. If the safety signs are missing, damaged, or unreadable, obtain and install replacement safety signs immediately. (SG-5)

⚠ WARNING Do not modify or alter this Implement. Do not permit anyone to modify or alter this Implement, any of its components or any Implement function. (SG-8)

⚠ DANGER Never work under the Implement, the framework, or any lifted component unless the Implement is securely supported or blocked up to prevent sudden or inadvertent falling which could cause serious injury or even death. (SG-14)



⚠ WARNING Never attempt to lubricate, adjust, or remove material from the Implement while it is in motion or while tractor engine is running. (SG-20)

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SAFETY

⚠WARNING Periodically inspect all moving parts for wear and replace when necessary with authorized service parts. Look for loose fasteners, worn or broken parts, and leaky or loose fittings. Make sure all pins have cotter pins and washers. Serious injury may occur from not maintaining this machine in good working order. (SG-21)

⚠WARNING Perform service, repairs and lubrication according to the maintenance section. Ensure the unit is properly lubricated as specified in the lubrication schedule and all bolts and nuts are properly torqued. Failure to properly service, repair and maintain this Implement in good operating condition could cause component failure and possible serious injury or even death. (SG-35)

⚠WARNING Use caution and wear protective gloves when handling sharp objects such as blades, knives, and other cutting edges. Be alert to worn component surfaces which have sharp edges. Sharp surfaces can inflict severe laceration injuries if proper hand protection is not worn. (SG-37)

⚠ DANGER Replace bent or broken blades with new blades. NEVER ATTEMPT TO STRAIGHTEN, WELD, OR WELD HARDFACING ON BLADES SINCE THIS WILL LIKELY CRACK OR OTHERWISE DAMAGE THE BLADE WITH SUBSEQUENT FAILURE AND POSSIBLY CAUSE SERIOUS INJURY FROM THROWN BLADES. (SGM-10)

⚠WARNING DO NOT weld or repair rotating mower components. Welds and other repairs may cause severe vibration and/or component failure resulting in part being thrown from the mower causing serious bodily injury. See your Authorized Dealer for proper repairs. (SGM-13)

PARTS INFORMATION

Alamo Industrial mowers use balanced and matched system components for blade carriers, blades, cuttershafts, knives, knife hangers, rollers, drivetrain components, and bearings. These parts are made and tested to Alamo Industrial specifications. Non-genuine "will fit" parts do not consistently meet these specifications. The use of “will fit” parts may reduce mower performance, void mower warranties, and present a safety hazard. Use genuine Alamo Industrial mower parts for economy and safety. (SPAM-1)

SEE YOUR ALAMO DEALER

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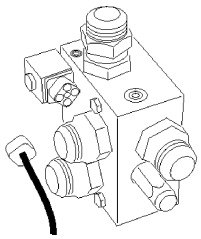
⚠ DANGER Always disconnect the main PTO Driveline from the Tractor before performing service on the Mower. Never work on the Mower with the tractor PTO driveline connected and running. Blades or Drivelines could turn without warning and cause immediate entanglement, injury or death. (SRM-3)

⚠ DANGER Always disconnect the wire leads from the mower valve solenoid before performing service on the Tractor or Mower. Use caution when working on the Tractor or Mower. Tractor engine must be stopped before working on Mower or Tractor. The Mower Blades could inadvertently be turned on without warning and cause immediate dismemberment, injury or death. (SBM-12)



Concluding Safety Instructions and Practices

In addition to the design and configuration of this Implement, including Safety Signs and Safety Equipment, hazard control and accident prevention are dependent upon the awareness, concern, prudence, and proper training of personnel involved in the operation, transport, maintenance, and storage of the machine. Refer also to Safety Messages and operation instruction in each of the appropriate sections of the Tractor and Equipment Manuals. Pay close attention to the Safety Signs affixed to the Tractor and Equipment. (SG-18)

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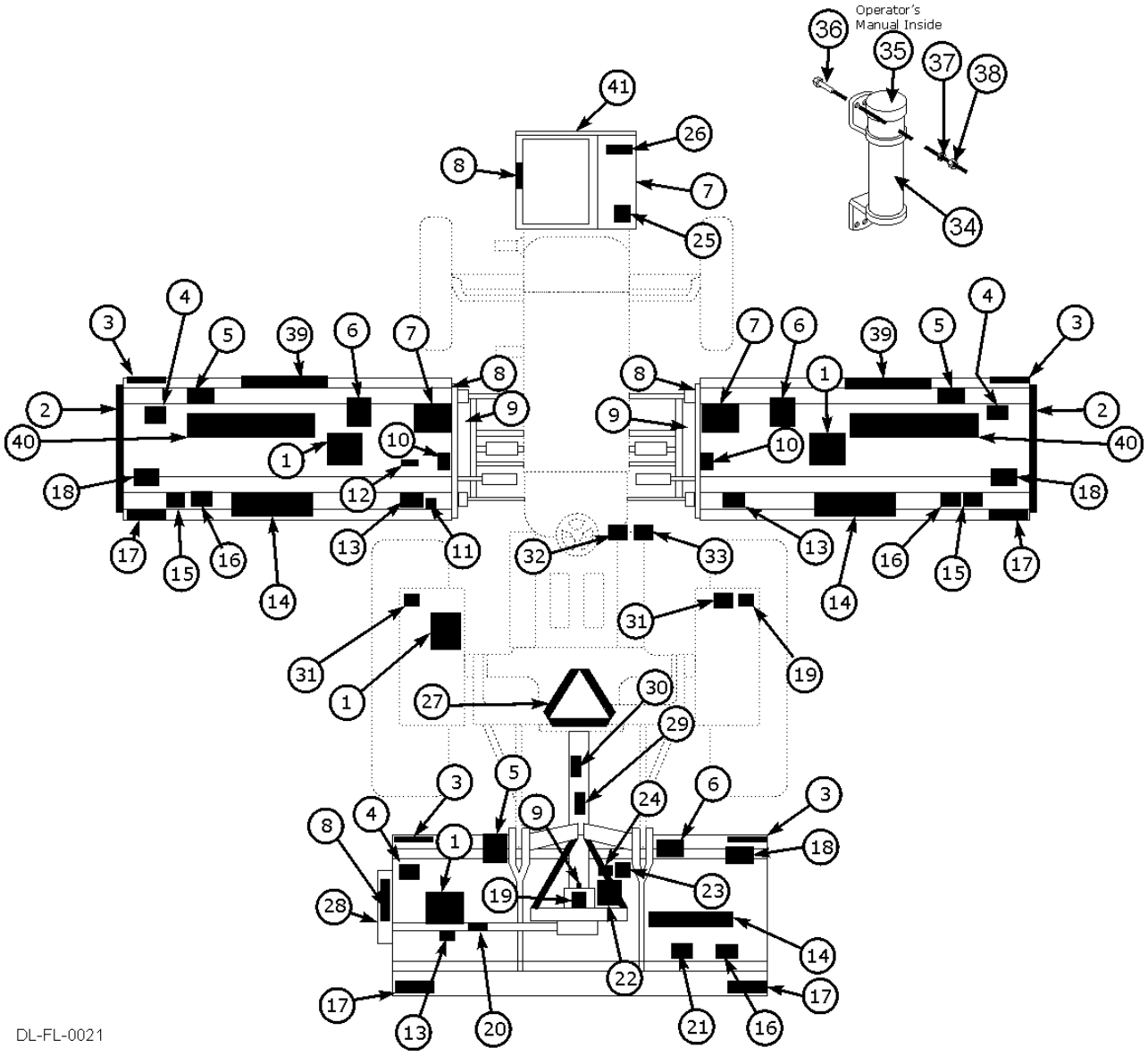
SAFETY

Decal Location

NOTE: Alamo Industrial supplies safety decals on this product to promote safe operation. Damage to the decals may occur while in shipping, use, or reconditioning. Alamo Industrial cares about the safety of its customers, operators, and bystanders, and will replace the safety decals on this product in the field, free of charge (Some shipping and handling charges may apply). Contact your Alamo Industrial dealer to order replacement decals.



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ITEM	PART NO.	QTY	LEVEL	DESCRIPTION
1.	002369	4	DANGER	Multiple-Hazard
2.	02988385	6	LOGO	Terrain King Logo
3.	1458393	4	REFLECTR	Yellow Reflector Decal
4.	02925100	3	INSTRUC	Genuine Terrain King Parts
5.	002425	3	DANGER	Cutting & Entanglement Hazard
6.	02967668	3	DANGER	Thrown Object Keep Away
7.	02965262	3	DANGER	Oil Penetration, Leaks
8.	00758194	4	WARNING	Belt/Pulley Pinch Point
9.	000678	3	INSTRUC	Grease Fitting Inside
10.	02962765	2	DANGER	Crushing From Folding Hazard
11.	03200285	1	CAUTION	Slipping on Step Hazard
12.		1	SERIAL #	Serial Number
13.	000108	3	INSTRUC	Flail Operation
14.	02990257	2	LOGO	Terrain Master Logo
15.	001829	2	INSTRUC	Wing Lube Chart
16.	002023	3	INSTRUC	Cutting Height Adjustment
17.	1458392	4	REFLECTR	Red Reflector Decal
18.	00725739	3	WARNING	Flail Shield Missing
19.	00763977	2	INSTRUC	Notice to Owner
20.	00725746	1	PELIGRO	Translate in Spanish
21.	001830	1	INSTRUC	Rear Unit Lube Chart
22.	00756494	1	DANGER	Driveline Hazards
23.	00773723	1	PELIGRO	Driveline Manual Spanish
24.	D103	1	WARNING	Operate at 540 RPM
25.	02966305	1	INSTRUC	Hyd Oil and Type
26.	02971123	1	WARNING	Pressurized Tank
27.	03200347	*	REFLECTR	SMV Reflector
28.		1	LOGO	Flail King Logo
29.	00756004	1	DANGER	Shield Missing Do Not Operate
30.	00756005	1	DANGER	Keep Away Rotating Driveline
31.	00753840	2	DANGER	Wing Falling
32.	03200328	1	DANGER	Transport with Lever in Detent
33.	001412	1	INSTRUC	Valve Lever Operating Plate1
34.	00776031	1		Canister (Operator's Manual)
35.	803213C	1		Terrain Master Operators Manual
36.	10058000	4		Bolt
37.	00017000	4		Lock washer
38.	0024100	4		Flatwasher
39.	001660	2	LOGO	Interstater
40.	02979544	2	LOGO	Alamo Industrial
41.	00757139	1	LOGO	Alamo Industrial

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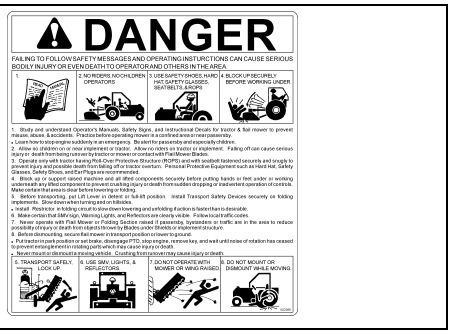
Decal Description

Danger! Mult-Hazard Warning. Failing to follow these Safety Messages and Operating Instructions can cause serious bodily injury or even death to operator and others in the area.


DANGER
FAILING TO FOLLOW SAFETY MESSAGES AND OPERATING INSTURCTIONS CAN CAUSE SERIOUS BODILY INJURY OR EVEN DEATH TO OPERATOR AND OTHERS IN THE AREA.
1
2. NO RIDERS, NO CHILDREN OPERATORS
3. USE SAFETY SHOES, HARD HAT, SAFETY GLASSES, SEAT BELTS, & ROPS
4. BLOCK UP SECURELY BEFORE WORKING UNDER.
1. Study and understand Operator's Manuals, Safety Signs, and Instructional Decals for tractor & flail mower to prevent misuse, abuse, & accidents. Practice before operating mower in a confined area or near passersby.
• Learn how to stop engine suddenly in an emergency. Be alert for passersby and especially children.
2. Allow no children on or near implement or tractor. Allow no riders on tractor or implement. Falling off can cause serious injury or death from being runover by tractor or mower or contact with Flail Mower Blades.
3. Operate only with tractor having Roll-Over Protective Structure (ROPS) and with seatbelt fastened securely and snugly to prevent injury and possible death from falling off or tractor overturn. Personal Protective Equipment such as Hard Hat, Safety Glasses, Safety Shoes, and Ear Plugs are recommended.
4. Block up or support raised machine and all lifted components securely before putting hands or feet under or working underneath any lifted component to prevent crushing injury or death from sudden dropping or inadvertent operation of controls. Make certain that area is clear before lowering or folding.
5. Before transporting, put Lift Lever in detent or full-lift position. Install Transport Safety Devices securely on folding implements. Slow down when turning and on hillsides.
• Install Restrictor in folding circuit to slow down lowering and unfolding if action is faster than is desirable.
6. Make certain that SMV sign, Warning Lights, and Reflectors are clearly visible. Follow local traffic codes.
7. Never operate with Flail Mower or Folding Section raised if passersby, bystanders or traffic are in the area to reduce possibility of injury or death from objects thrown by Blades under Shields or implement structure.
8. Before dismounting, secure flail mower in transport position or lower to ground.
• Put tractor in park position or set brake, disengage PTO, stop engine, remove key, and wait until noise of rotation has ceased to prevent entanglement in rotating parts which may cause injury or death.
• Never mount or dismount a moving vehicle. Crushing from runover may cause injury or death.
5. TRANSPORT SAFELY, LOCK UP.
6. USE SMV, LIGHTS, & REFLECTORS.
7. DO NOT OPERATE WITH MOWER OR WING RAISED.
8. DO NOT MOUNT OR DISMOUNT WHILE MOVING.

P/N 30000002369

DANGER
FAILING TO FOLLOW SAFETY MESSAGES AND OPERATING INSTURCTIONS CAN CAUSE SERIOUS BODILY INJURY OR EVEN DEATH TO OPERATOR AND OTHERS IN THE AREA.
1.
READ
MANUAL
2. NO RIDERS, NO CHILDREN OPERATORS
3. USE SAFETY SHOES, HARD HAT, SAFETY GLASSES, SEAT BELTS, & ROPS
4. BLOCK UP SECURELY BEFORE WORKING UNDER.
1. Study and understand Operator's Manuals, Safety Signs, and Instructional Decals for tractor & flail mower to prevent misuse, abuse, & accidents. Practice before operating mower in a confined area or near passersby.
• Learn how to stop engine suddenly in an emergency. Be alert for passersby and especially children.
2. Allow no children on or near implement or tractor. Allow no riders on tractor or implement. Falling off can cause serious injury or death from being runover by tractor or mower or contact with Flail Mower Blades.
3. Operate only with tractor having Roll-Over Protective Structure (ROPS) and with seatbelt fastened securely and snugly to prevent injury and possible death from falling off or tractor overturn. Personal Protective Equipment such as Hard Hat, Safety Glasses, Safety Shoes, and Ear Plugs are recommended.
4. Block up or support raised machine and all lifted components securely before putting hands or feet under or working underneath any lifted component to prevent crushing injury or death from sudden dropping or inadvertent operation of controls. Make certain that area is clear before lowering or folding.
5. Before transporting, put Lift Lever in detent or full-lift position. Install Transport Safety Devices securely on folding implements. Slow down when turning and on hillsides.
• Install Restrictor in folding circuit to slow down lowering and unfolding if action is faster than is desirable.
6. Make certain that SMV sign, Warning Lights, and Reflectors are clearly visible. Follow local traffic codes.
7. Never operate with Flail Mower or Folding Section raised if passersby, bystanders or traffic are in the area to reduce possibility of injury or death from objects thrown by Blades under Shields or implement structure.
8. Before dismounting, secure flail mower in transport position or lower to ground.
• Put tractor in park position or set brake, disengage PTO, stop engine, remove key, and wait until noise of rotation has ceased to prevent entanglement in rotating parts which may cause injury or death.
• Never mount or dismount a moving vehicle. Crushing from runover may cause injury or death.
5. TRANSPORT SAFELY, LOCK UP.
6. USE SMV, LIGHTS, & REFLECTORS.
7. DO NOT OPERATE WITH MOWER OR WING RAISED.
8. DO NOT MOUNT OR DISMOUNT WHILE MOVING.
002369

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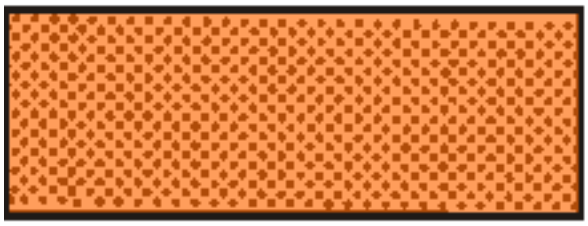
Name LOGO - Alamo Industrial

P/N 02979546

Amber Reflector. Keep reflectors clean and visible.



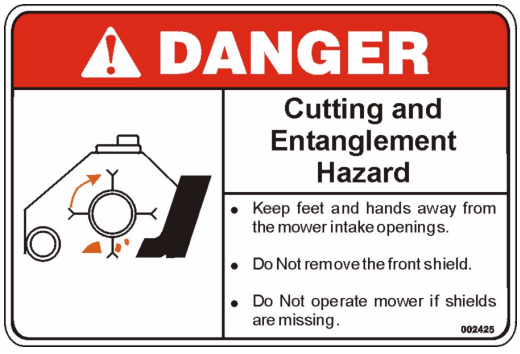
P/N 30001458393

IMPORTANT - Use only Genuine Terrain King replacement parts.

IMPORTANT
For your safety and to guarantee optimum product reliability, always use genuine Terrain King replacement parts. The use of inferior "will-fit" parts will void warranty of your Terrain King implement and may cause premature or catastrophic failure which can result in serious injury or death. If you have any question concerning repair parts you are using, contact Terrain King, 1502 E. Walnut, Seguin Tx. Customer Service 800-882-5756.
TERRAINKING
30002925100

P/N 30002925100

DANGER! Keep Away! If front deflector shield is removed from flail housing, serious injury to or amputation of hands, feet, or limbs may occur from blades contact. Always make sure that all shields are in place at all times.


DANGER
Cutting and Entanglement Hazard
Keep feet and hands away from the mower intake openings.
Do Not remove the front shield.
Do Not operate mower if shields are missing.
002425

P/N 30000002425

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SAFETY

DANGER! - Keep Away - Thrown Objects. Inspect area before mowing. Do not let rotating blades contact solid objects. Operate only if all Guards - Deflectors are in place. Do not operate with Mower or Wing raised off the ground. Stop mowing if Passerby enter the area. Stay away from rotating blades. Keep hands and feet away from rotating blades. Do not approach mower until all movement has stopped.

P/N 30002967668

DANGER
KEEP AWAY - THROWN OBJECTS
TRASH
• Inspect the area before mowing for potential mower hazards. Remove or avoid all foreign objects such as wire, cable, metal objects, and all other foreign material.
• Foreign material can be thrown from the mower and cause serious bodily injury to the operator and passersby.
• Do Not let rotating blades contact solid objects like rocks, posts, curbs or guard rails.
• Operate only if all Guards-Deflectors are in place and in good condition.
• Do Not operate with Mower or Wing raised off the ground.
• Stop mowing if Passersby enter the area of thrown objects. (See Operator's Manual)
• Stay away from rotating blades. Keep hands and feet away from rotating blades.
• Do Not approach mower until all motion has stopped.
05967668

WARNING! Failure to INSPECT and REPAIR or REPLACE Hoses may allow worn Hoses to rupture SUDDENLY and VIOLENTLY with resulting serious BODILY INJURY from SCALDING or FIRE with resulting BURN INJURY or DEATH.

P/N 30002965262

WARNING
DO NOT OPERATE EQUIPMENT WITH OIL LEAKS
1. High pressure fluid can be invisible and can be injected into the body through the skin. Serious injury or even death can result. A doctor familiar with this type of injury must surgically remove the injected fluid immediately.
2. You should visually inspect for hydraulic fluid leaks before using the equipment. Never use your hand to check for leaks. Wear oil impenetrable gloves, safety glasses, and use a piece of wood or cardboard to check for evidence of leaks. If you suspect a leak, Remove the hose and have it tested at a Dealer.
3. Inspect hoses regularly. Frayed, torn, or crimped hoses may rupture suddenly and violently resulting in serious bodily injury from a flying hose end or from scalding, burn injuries, or oil penetration. Oil sprayed on hot equipment or components can result in fire. Repair or replace hoses as indicated to prevent unexpected failure and possible serious injury to operator or bystanders.
KEEP SHIELDS OVER HYDRAULIC COMPONENTS IN PLACE.
02965262

WARNING! Do not operate with Belt Shield removed. Finger(s) may be pinched off if get caught between V-Belt and Pulley.

P/N 30000758194

Information that Grease Fitting is present and must apply grease.

P/N 30000000678

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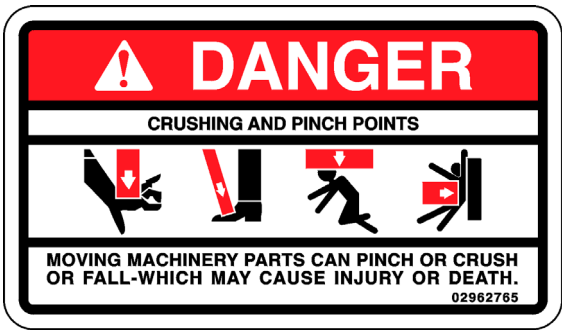
DANGER! Crushing and Pinch Points.
Moving machinery parts can pinch or crush or fall- which may cause injury or death.

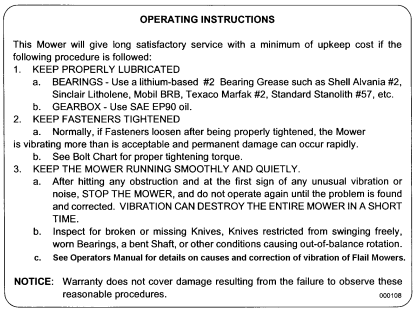

DANGER
CRUSHING AND PINCH POINTS
MOVING MACHINERY PARTS CAN PINCH OR CRUSH OR FALL-WHICH MAY CAUSE INJURY OR DEATH.
02962765

P/N 30002962765

CAUTION! Watch your step.

P/N 30003200285

Instructions to properly lubricate and check mower for potential problems prior to operation.



OPERATING INSTRUCTIONS

This Mower will give long satisfactory service with a minimum of upkeep cost if the following procedure is followed:

1. KEEP PROPERLY LUBRICATED
   a. BEARINGS - Use a lithium-based #2 Bearing Grease such as Shell Alvania #2, Sinclair Litholene, Mobil BRB, Texaco Marfak #2, Standard Stanolith #57, etc.
   b. GEARBOX - Use SAE EP90 oil.
2. KEEP FASTENERS TIGHTENED
   a. Normally, if Fasteners loosen after being properly tightened, the Mower is vibrating more than is acceptable and permanent damage can occur rapidly.
   b. See Bolt Chart for proper tightening torque.
3. KEEP THE MOWER RUNNING SMOOTHLY AND QUIETLY.
   a. After hitting any obstruction and at the first sign of any unusual vibration or noise, STOP THE MOWER, and do not operate again until the problem is found and corrected. VIBRATION CAN DESTROY THE ENTIRE MOWER IN A SHORT TIME.
   b. Inspect for broken or missing Knives, Knives restricted from swinging freely, worn Bearings, a bent Shaft, or other conditions causing out-of-balance rotation.
   c. **See Operators Manual for details on causes and correction of vibration of Flail Mowers.**

NOTICE: Warranty does not cover damage resulting from the failure to observe these reasonable procedures.

000108

P/N 30000000108

ALAMO INDUSTRIAL LOGO

P/N 001651

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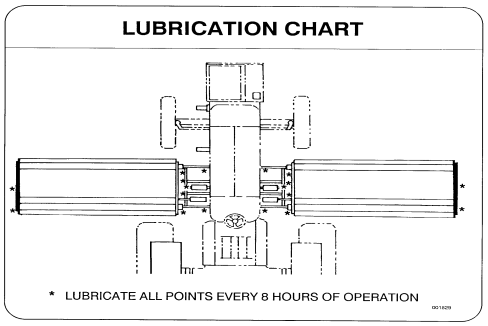
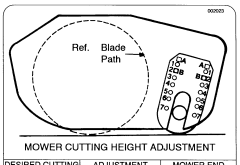
INFORMATION - 8 Hour Lubrication Chart



P/N 30000001829

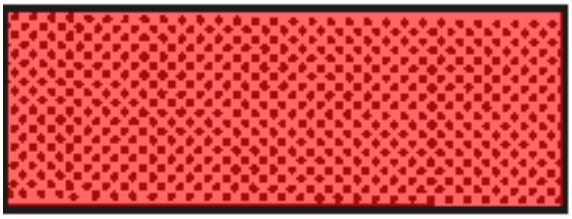
Cutting Height Adjustment Chart



DESIRED CUTTING HEIGHT (INCHES)	ADJUSTMENT BRACKET HOLE	MOWER END PLATE HOLE
1/2	B	2
1	A	1
1-1/2	B	3
2	A	2
2-1/2	B	4
3	A	3
3-1/2	B	5
4	A	4
4-1/2	B	6
5	A	5
5-1/2	B	7
6	A	6

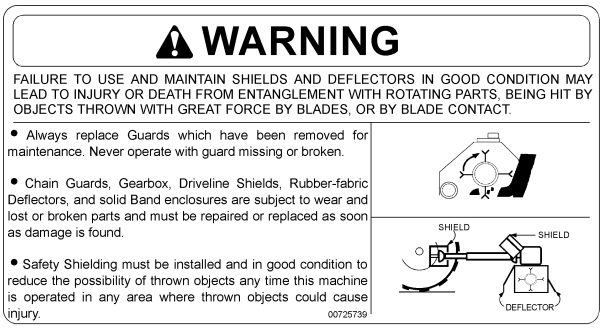
P/N 30000002023

Red Reflector. Keep reflectors clean and visible.



P/N 30001458392

WARNING! Failure to use and maintain shields and deflectors in good condition may lead to injury or death from entanglement with rotating parts, being hit by objects thrown with great force by blades, or by blade contact.


WARNING
FAILURE TO USE AND MAINTAIN SHIELDS AND DEFLECTORS IN GOOD CONDITION MAY LEAD TO INJURY OR DEATH FROM ENTANGLEMENT WITH ROTATING PARTS, BEING HIT BY OBJECTS THROWN WITH GREAT FORCE BY BLADES, OR BY BLADE CONTACT.
• Always replace Guards which have been removed for maintenance. Never operate with guard missing or broken.
• Chain Guards, Gearbox, Driveline Shields, Rubber-fabric Deflectors, and solid Band enclosures are subject to wear and lost or broken parts and must be repaired or replaced as soon as damage is found.
• Safety Shielding must be installed and in good condition to reduce the possibility of thrown objects any time this machine is operated in any area where thrown objects could cause injury.
00725739
SHIELD
SHIELD
DEFLECTOR

P/N 30000725739

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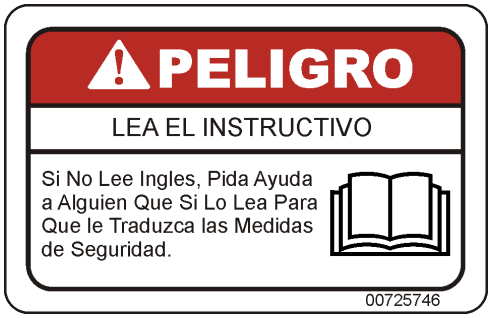
Operator's Manual (with repair parts) and warranty was attached to this implement during final inspection.

NOTICE TO OWNER
An OPERATOR'S MANUAL (with Repair Parts Listing) and a WARRANTY REGISTRATION CARD were attached to this implement during final inspection at the factory. If they were not attached at the time of purchase, please contact your selling dealer at once.
1. Read and understand the Operator's Manual before operating the implement.
2. Complete, sign, and mail the Warranty Registration Card today.
00763977

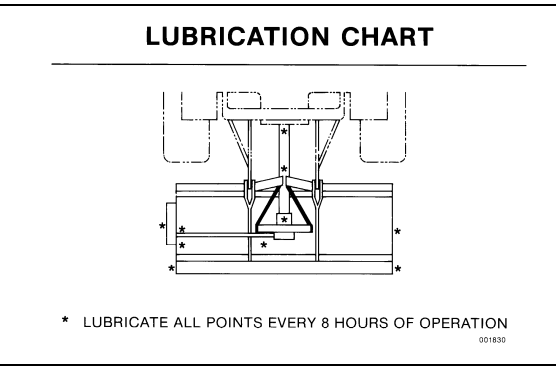
P/N 30000763977

Peligro Translation, If you do not know how to read English, please find someone who knows how to read English.


PELIGRO
LEA EL INSTRUCTIVO
Si No Lee Ingles, Pida Ayuda a Alguien Que Si Lo Lea Para Que le Traduzca las Medidas de Seguridad.
00725746

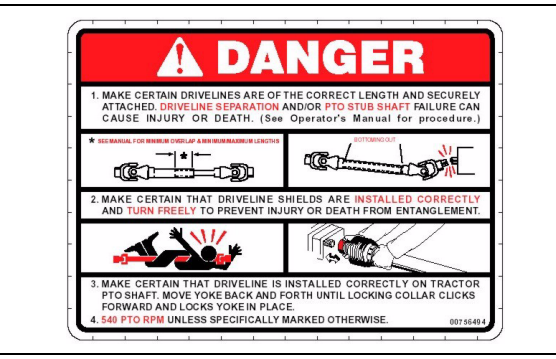
P/N 30000725746

INFORMATION - 8 Hour Lubrication Chart



P/N 30000001830

DANGER! Make certain that drivelines are correct length and are securely attached.


DANGER
1. MAKE CERTAIN DRIVELINES ARE OF THE CORRECT LENGTH AND SECURELY ATTACHED. DRIVELINE SEPARATION AND/OR PTO STUB SHAFT FAILURE CAN CAUSE INJURY OR DEATH. (See Operator's Manual for procedure.)
2. MAKE CERTAIN THAT DRIVELINE SHIELDS ARE INSTALLED CORRECTLY AND TURN FREELY TO PREVENT INJURY OR DEATH FROM ENTANGLEMENT.
3. MAKE CERTAIN THAT DRIVELINE IS INSTALLED CORRECTLY ON TRACTOR PTO SHAFT. MOVE YOKE BACK AND FORTH UNTIL LOCKING COLLAR CLICKS FORWARD AND LOCKS YOKE IN PLACE.
4. 540 PTO RPM UNLESS SPECIFICALLY MARKED OTHERWISE.
00756494

P/N 30000756494

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PELIGRO! Spanish Translation for Driveline Safety

PELIGRO
Un manual de la seguridad de la línea de conducción n/p 00773776 está disponible en español. Llame el número enumerado para una copia grátis.
LINEA DE CONDUCCION GIRATORIA-
EL CONTACTO PUEDE CAUSAR LA MUERTE
¡MANTENERSE LEJOS!
NO FUNCIONE SIN QUE-
• Todos los protectores de la linea de conducción, alimentador y blindajes del equipo estén en su lugar.
• Las líneas de conducción estén conectadas con seguridad en ambos extremos.
• Los protectores de la línea de conducción den vuelta libremente en la línea de conducción.
00773723

P/N 30000773723

WARNING! Avoid Bodily Injury, Use 540RPM PTO Speed Only.

P/N 3000000D103

INFORMATION - Attention - Service Hydraulic System with Universal Tractor Hydraulic Oil. Alamo Group part Number 30002966307.

30002966305

WARNING! Pressurized Tank - Slowly open cap to relieve pressure before completely removing cap. Stay clear to prevent being scalded with hot oil which may cause serious injury to eyes, face and exposed skin.

WARNING
PRESSURIZED TANK
• ATTENTION: Oil Filler Cap Is Also the PRESSURE RELIEF CAP.
• Remove Cap slowly to relieve pressure before removing Cap completely.
• Stay clear to prevent being scalded with hot oil that may spray out of tank that is still pressurized and may cause serious injury to eyes, face, and exposed skin.
02971123

P/N 30002971123

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ALAMO NAME LOGO.

P/N 001650

Slow Moving Vehicle Decal. Keep SMV reflector clean and visible. DO NOT transport or operate without the SMV.

P/N 30003200347

DANGER! Guard Missing, Do Not Operate. If you see this decal, Do Not Operate the mower until the shield has been replaced.

P/N 30000756004

DANGER! Rotating Driveline Keep Away, Contact can cause death.

P/N 30000756005

DANGER
ROTATING DRIVELINE-
CONTACT CAN CAUSE DEATH
KEEP AWAY!
DO NOT OPERATE WITHOUT-
• All driveline guards, tractor and equipment shields in place.
• Drivelines securely attached at both ends.
• Driveline guards that turn freely on driveline.
00756005

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SAFETY

DANGER! Stay clear when lowering or raising wings.

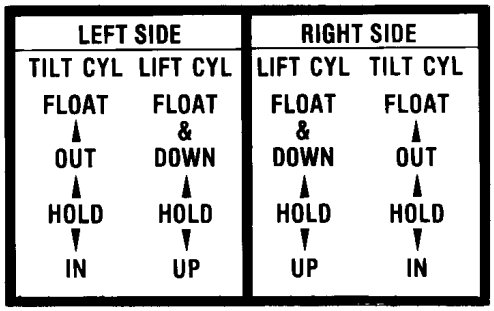
DANGER
Stay Clear when removing transport and lowering or raising wing.
Components failure or accidental operation of controls may allow wing to fall suddenly and cause bodily injury or death.
Cylinders with Restrictions installed must be filled with oil for wings to lower slowly and safely.
Lock wings up securely for transporting.
Do not operate mower with wings raised when passerby are in the area.
Contact with exposed rotating Blades and/or being hit by thrown objects may cause injury or death.
00753840

P/N 30000753840

DANGER! - Transport with Lever in Neutral Position to prevent inadvertent unfolding.

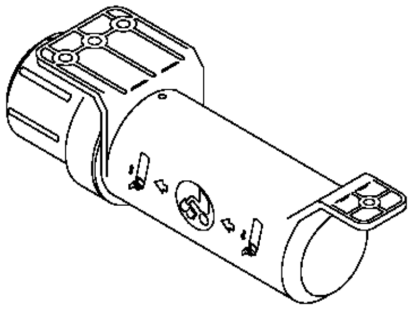
P/N 30003200328

Cylinder Controls for Lift and Tilt.



30000001412

Read Operator's Manual! The operator's manual is located inside this canister. If the manual is missing order one from your dealer.



P/N 30000776031

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INTERSTATER NAME LOGO.

P/N 001660

Name LOGO - Alamo Industrial

P/N 02979544

Name LOGO - Alamo Industrial

P/N 00757139

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Federal Laws and Regulations

This section is intended to explain in broad terms the concept and effect of federal laws and regulations concerning employer and employee equipment operators. This section is not intended as a legal interpretation of the law and should not be considered as such.

Employer-Employee Operator Regulations

U.S. Public Law 91-596 (The Williams-Steiger Occupational and Health Act of 1970) OSHA

This Act Seeks:

"...to assure so far as possible every working man and woman in the nation safe and healthful working conditions and to preserve our human resources..."

DUTIES

Sec. 5 (a) Each employer-

(1) shall furnish to each of his employees employment and a place of employment which are free from recognized hazards that are causing or are likely to cause death or serious physical harm to his employees;

(2) shall comply with occupational safety and health standards promulgated under this Act.

(b) Each employee shall comply with occupational safety and health standards and all rules, regulations and orders issued pursuant to this Act which are applicable to his own actions and conduct.

OSHA Training Requirements

Title 29, Code of Federal Regulations Part 1928.57(a)(6). **www.osha.gov**

Operator instructions. At the time of initial assignment and at least annually thereafter, the employer shall instruct every employee who operates an agricultural tractor and implements in the safe operating practices and servicing of equipment with which they are or will be involved, and of any other practices dictated by the work environment.

Keep all guards in place when the machine is in operation;

Permit no riders on equipment

Stop engine, disconnect the power source, and wait for all machine movement to stop before servicing, adjusting, cleaning or unclogging the equipment, except where the machine must be running to be properly serviced or maintained, in which case the employer shall instruct employees as to all steps and procedures which are necessary to safely service or maintain the equipment.

Make sure everyone is clear of machinery before starting the engine, engaging power, or operating the machine.

Employer Responsibilities:

To ensure employee safety during Tractor and Implement operation, it is the employer's responsibility to:

1. Train the employee in the proper and safe operation of the Tractor and Implement.
2. Require that the employee read and fully understand the Tractor and Implement Operator's manual.
3. Permit only qualified and properly trained employees to operate the Tractor and Implement.
4. Maintain the Tractor and Implement in a safe operational condition and maintain all shields and guards on the equipment.
5. Ensure the Tractor is equipped with a functional ROPS and seat belt and require that the employee operator securely fasten the safety belt and operate with the ROPS in the raised position at all times.
6. Forbid the employee operator to carry additional riders on the Tractor or Implement.
7. Provide the required tools to maintain the Tractor and Implement in a good safe working condition and provide the necessary support devices to secure the equipment safely while performing repairs and service.
8. Require that the employee operator stop operation if bystanders or passersby come within 300 feet.

Child Labor Under 16 Years of Age

Some regulations specify that no one under the age of 16 may operate power machinery. It is your responsibility to know what these regulations are in your own area or situation. (Refer to U.S. Dept. of Labor, Employment Standard Administration, Wage & Home Division, Child Labor Bulletin #102.)

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INTRODUCTION SECTION

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INTRODUCTION

This Flail Mower is designed with care and built with quality materials by skilled workers. Proper assembly, maintenance, and operating practices, as described in this manual, will help the owner/operator get years of satisfactory service from the machine.

The purpose of this manual is to familiarize, instruct, and train. The Assembly Section instructs the owner/operator in the correct assembly of the Mower using standard and optional equipment. The Parts Manual is designed to familiarize the owner/operator with replaceable parts on the Mower and is provided also. This section provides exploded assembly drawings of each mower component illustrating each piece and the corresponding part number.

Careful use and timely service saves extensive repairs and costly downtime losses. The Operation and Maintenance Sections of the manual train the owner/operator how to work the Mower correctly and attend to appropriate maintenance. The Trouble Shooting Guide helps diagnose difficulties with mower and offers solution to the problems.

Safety is of primary importance to the owner/operator and to the manufacturer. The first section of this manual includes a list of Safety Messages, that, if followed, will help protect the operator and bystanders from injury or death. Many of the Safety Messages will be repeated throughout the manual. The owner/operator/dealer should know these Safety Messages before assembly and be aware of the hazards of operating this mower during assembly, use, and maintenance. The Safety Alert Symbol combined with a Signal Word, as seen below, is intended to warn the owner/operator of impending hazards and the degree of possible injury faced when operating this machine.

⚠ DANGER Indicates an imminently hazardous situation that, if not avoided, WILL result in DEATH OR VERY SERIOUS INJURY.

⚠ WARNING Indicates an imminently hazardous situation that, if not avoided, COULD result in DEATH OR SERIOUS INJURY.

⚠ CAUTION Indicates an imminently hazardous situation that, if not avoided, MAY result in MINOR INJURY.

Important Identifies special instructions or procedures that, if not strictly observed, could result in damage to, or destruction of the machine, attachments or the environment.

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INTRODUCTION

The Interstater is a revolutionary mowing system. Utilizing 2 side wings and 1 rear, you have ability to mow up to 20' across in on swath. Perfect for large areas of mowing including interstate highways and airport fields. A productive way to get a manicured cut in spaces there is high public visibility.

Unique in-frame cooling system maintains the proper oil temperature while providing constant power flow.

Strong top decks make with 10-gauge steel and end plates that are 1/2" thick for the inboard and 5/16" thick steel for the outboard.

Smart front mount hydraulic pump that drives power from the crankshaft of tractor, while twin piston pumps provide the power for the wing mowing units.

Knife Variety - An array of cutting knife options allows you to tailor the finished appearance to meet your needs.

Cutting Capacity: 1" diameter grass and weeds.

Wing Cutting Widths:

20' 9" Interstater, 88" Rear Flail, 88" Left and Right Wings

18' 5" Interstater, 88" Rear Flail, 74" Left and Right Wings

16' 5" Interstater, 88" Rear Flail, 60" Left and Right Wings

13' 2" Single-Side Interstater, 88" Rear Flail and 88" Right Wing

12' 2" Single-Side Interstater, 88" Rear Flail and 74" Right Wing

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INTRODUCTION

Attention Owner/Operator

BEFORE OPERATING THIS MACHINE:

1. Carefully read the Operator's Manual, completely understand the Safety Messages and instructions, and know how to operate correctly both the tractor and implement.

2. Fill out the Warranty Card in full. Be sure to answer all questions, including the Serial Number of the implement. Mail within 30 days of delivery date of this implement.

NOTE: Warranties are honored only if completed "Owner Registration and Warranty" forms are received by Alamo Group within thirty days of delivery of the implement.

3. Record the Model and Serial Numbers on the Warranty page at the front of the Operator's Manual. Keep this as part of the permanent maintenance file for the implement.

IMPORTANT
For your safety and to guarantee optimum product reliability, always use Genuine ALAMO INDUSTRIAL replacement parts. The use of inferior "will-fit" parts will void Warranty of your ALAMO INDUSTRIAL implement and may cause premature or catastrophic failure which can result in serious injury or death. If you have any questions concerning the repair parts you are using, contact ALAMO INDUSTRIAL, 1502 E. Walnut Seguin, TX 78155 (830) 372-3551.
ALAMO INDUSTRIAL
02926100

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ASSEMBLY SECTION

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ASSEMBLY

GENERAL INSTRUCTIONS

To assemble your new INTERSTATER and mount it to your tractor we assist you with drawings, instructions and information, also about experiences of others and when needed just get some information or clarification from our engineering department over the phone.

These instructions are general information and not specifically for your tractor, but in connection with our drawings, they might offer your some valuable assistance.

This section covers the installation procedure of an Alamo Group Interstater mower kit, and includes parts lists for framework, hoses, and miscellaneous parts to be attached to your tractor.

These instructions are for mounting the center mower, right side mower, and left side mower units. For mounting one mower side only, disregard information concerning the opposite side. Hardware quantities shown are for both sides.

1. The hydraulic system must be kept “SURGICALLY CLEAN” to ensure proper operation and long life of the pumps, motors, and valves. All components have protective caps over openings connected to internal spaces to prevent contamination. It is important that care be taken during unpacking, assembly, and other contaminants which will damage parts.
2. After the drive belts are installed, DO NOT start the tractor unless the hydraulic system is filled with hydraulic oil. Running without oil will damage the pumps.
3. Check the oil level in the reservoir before start-up.
4. Care should be taken when filling the reservoir to prevent contamination of the hydraulic system. Always use new hydraulic fluid when filling the system. USE ONLY TRACTOR HYDRAULIC OIL IN THE HYDRAULIC SYSTEM.Reference to the left or right side of the Interstater is determined while facing the front of the tractor from the drivers seat.

Reference to the left or right side of the Interstater is determined while facing the front of the tractor from the drivers seat.

Assemble the Interstater, step by step, as illustrated on the pages of this section. Small parts (bolts, nuts, etc.) required are packed in numbered plastic bags which correspond to assembly procedures and illustrations in the manual.

The part quantities listed for an illustration pertain only to that phase of assembly. The quantity given corresponds to the number of parts needed. When assembling a single-sided model based on a dual-sided model, the quantity furnished will usually be half the quantity listed.

Large parts are not always listed next to an illustration because they are usually easy to identify.

Whenever reference is made to parts, listed for an illustration or elsewhere in this manual, the following abbreviations are used:

HHCS - hex head capscrew	RH - right hand	NF - national fine
LW - lock washer	LH - left	MA - mechanical assembly
PW- plain washer	NC - national coarse	WA - welded assembly

When installing fasteners, PW and LW (generally installed in that order) are usually on the side of the fixture or part being fastened that the hex/lock nut is on. When only HHCS, LW and/or PW are required, they are generally installed in that order. Some parts do not require a PW or LW. Refer to illustrations for exceptions. Fasteners should be installed so they cause the least interference with other parts. When securing driveshaft pulley to hub, tighten fasteners to 9 lb-ft torque.

This manual makes reference to individual component parts, some of which may have been pre assembled at the factory.

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ASSEMBLY

PRELIMINARY TRACTOR PREPARATION

Depending on the make and model of tractor the INTERSTATER is to be mounted on, certain modifications will be illustrated. In some cases special accessory components for the tractor will be required before assembling the INTERSTATER. In these cases, specific mention will be made to the manufacturer, part number and description of required accessory component.

If so equipped, remove drawbar from rear of tractor. In most cases, the main frame rear pad is attached under the rear axle.

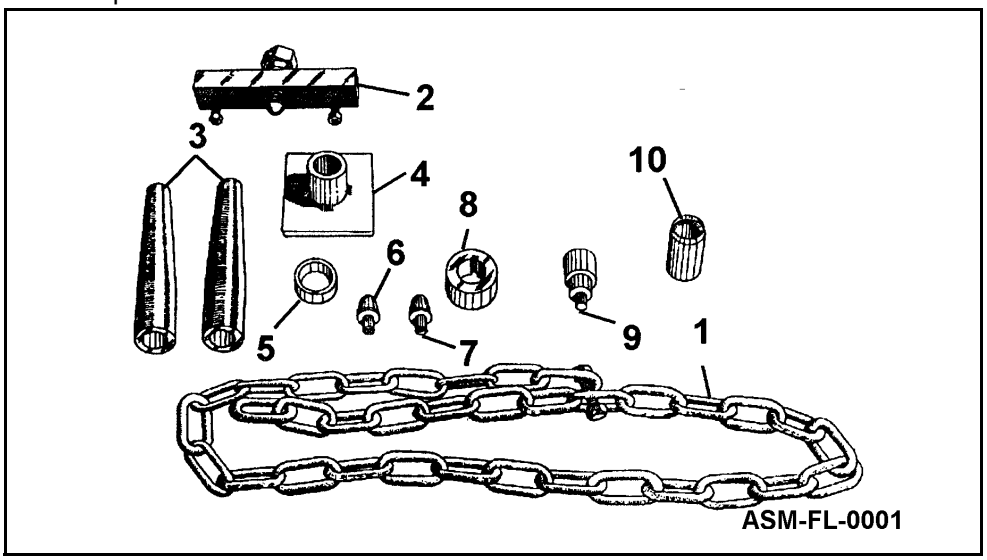
If so equipped, remove all objects from exterior of cab (lights, hand rails, etc.) which may interfere with mowers when placed in the transport position. Remove all objects from right front interior of cab structure which may interfere with mounting and operation of sectional control valve.

If so equipped, remove foot step from each side of tractor to which a mower will be mounted.

Front tractor wheels may require a wider adjustment to clear hydraulic tank and tank mounting frame.

SPECIAL TOOLS

Special tools, for installing and servicing INTERSTATER kits, are illustrated on the below. Drawings for these tools are available on request. If desired, tools may be obtained from Alamo on a made to order basis. Prices will be furnished on request. **ASM-FL-0001**



ITEM	PART NO.	CODE	DESCRIPTION
1	701628	S	Lift Frame Assembly Suspension Chain
2	701627	A	Cuttershaft Bearing Puller
3	104764	A	Lift Frame Alignment Pin (2)
4	104768	A	Rubber bushing Support Base
5	104767	A	Rubber Bushing Compression Ring
6	104765	A	Rubber Bushing Expander (Ford and Kubota Tractors)
7	104766	A	Rubber Bushing Expander (I.H.,Massey-Ferguson and Case Tractors)
8	104769	A	Driveshaft Installation Collar
9	1047770	A	Rubber Bushing Installation Plug
10	103741	A	Seal Installation and Setting Tool
-	000802	S	Hydraulic Pressure Gauge, 3000 PSI

A - Denotes Special Tools designed by Alamo
S - Denotes Standard Tools or Equipment available on the market

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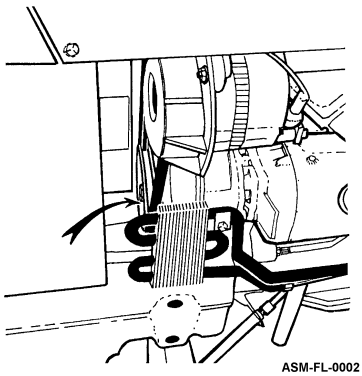
ASSEMBLY

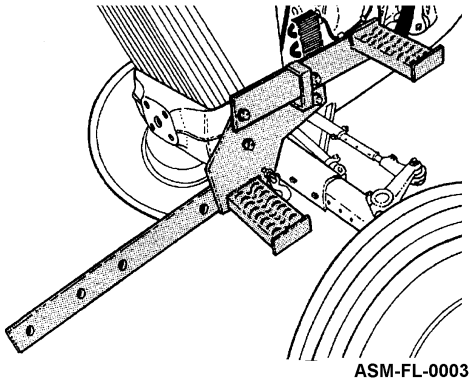
DRIVE COUPLING ATTACHMENT

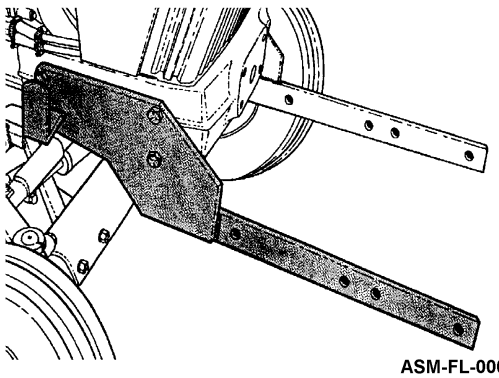
Assemble the front coupling to the engine crankshaft pulley using the hardware supplied with the coupling. Due to the variations in the tractor models, it may be necessary to remove some of the sheet metal to facilitate mounting of the coupling. **ASM-FL-0002**.


ASM-FL-0002

HYDRAULIC TANK, SUPPORTS AND MAINFRAME ATTACHMENT

1. Attach the left hydraulic tank support and step weldment to the tractor with (4) bolts provided in your Mount Kit. Refer to your particular Tractor Installation Drawing for part numbers and quantities. **ASM-FL-0003**
2. Attach the right hydraulic tank support to the tractor with (4) bolts provided in your Mount Kit. Refer to your particular Tractor Installation Drawing for part numbers and quantities. **ASM-FL-0004**
3. To make assembly easier, the hard plumbing assembly should be installed on the Mainframe before the Mainframe is installed. Use (2) 1/2” x 1-1/2” bolts, (2) 1/2" Flatwashers, and (2) 1/2" Locknuts. Metal tubing on assembly will need to be loosened to install bolts.


ASM-FL-0003


ASM-FL-0004

4. Position the mainframe under the tractor. Lift the front of the frame and install the top two 5/8” x 2" bolts. Install a 5/8" flatwasher and a 5/8" locknut on the bolts and tighten enough to hold the frame in place. **ASM-FL-0005**

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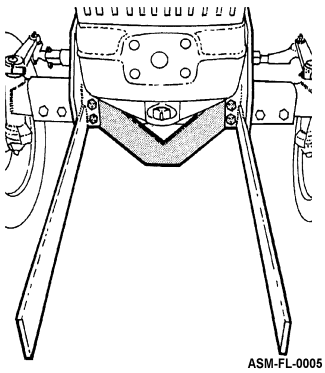
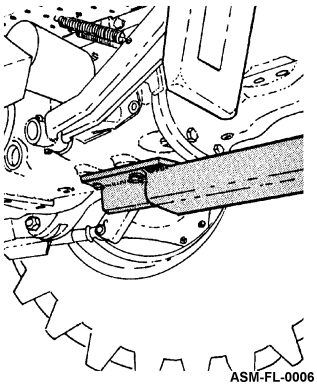
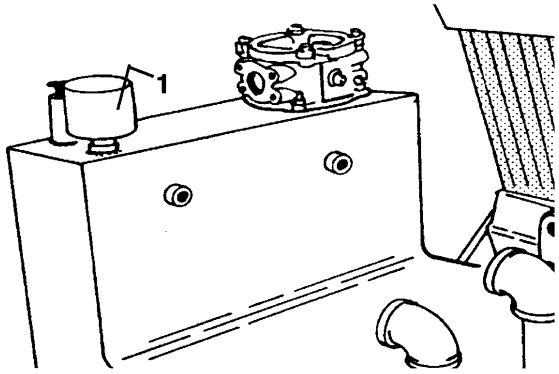
5. Lift the rear of the frame and secure with (4) 1/2" x 1 1/2" & (2) 5/8" x 1/3/4" bolts. Install the remaining front hardware. **ASM-FL-0006**


ASM-FL-0005


ASM-FL-0006

MOUNTING AND PUMP ASSEMBLY

1. Before mounting tank, attach pipe manifold for return lines to the return filter assembly.
2. Raise bumper with a forklift or hoist and lower onto hydraulic tank supports. Attach the bumper to the tank supports with (4) 1/2” x 2" bolts and (4) 1/2" locknuts. **ASM-FL-0007**
3. Now tighten all hardware for mainframe, tank support, tank, and bumper.

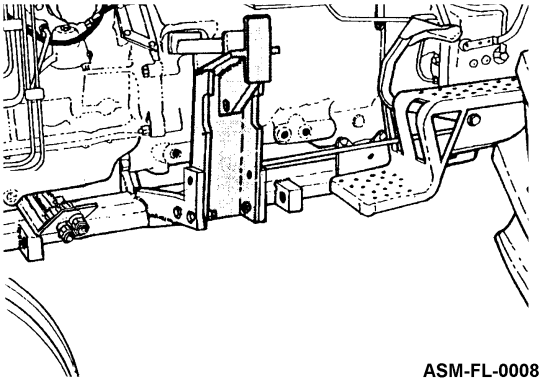


ASM-FL-0007

LIFT CYLINDER FRAME ATTACHMENT

Position the right and left lift cylinder supports and loosely install the (6) 3/4" x 2-1/4" bolts and (6) 3/4" locknuts to each side. Pull the supports outward and downward to remove the slack, then tighten the hardware. **ASM-FL-0008**

NOTE: On some applications Cylinder Support will have an extra set of holes. Refer to Installation Drawing for correct mounting.


ASM-FL-0008

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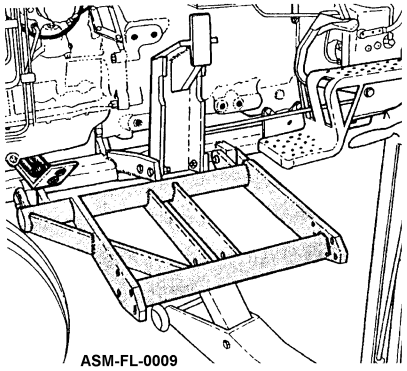
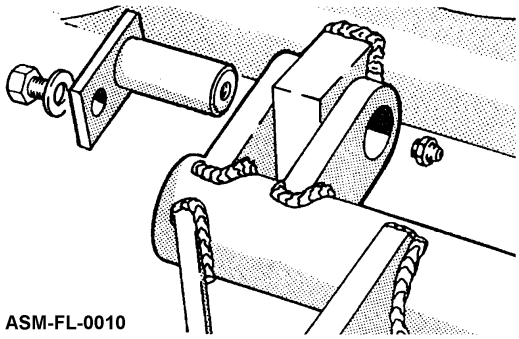
ASSEMBLY

Raise the left lift frame with the hydraulic jack and align frame with ears on main frame. **ASM-FL-0009.** Insert the upper pivot pins with the lift frame ears on the outside of the mainframe ears. Secure the pins with the (2) 3/8"x3/4" NF bolts and (2) 3/8" lockwashers. ***NOTE:*** *Use Locktight® on bolts.* **ASM-FL-0010.** Repeat procedure for right side.

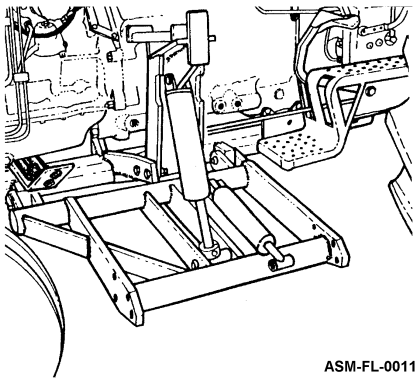

ASM-FL-0009


ASM-FL-0010

Mount the tilt and lift cylinders. The lift cylinder has a 3" bore diameter and the tilt cylinder has a 3-1/2" bore diameter. Be sure to remove the port caps before extending the cylinders. Attach with (2) cylinder pins and (2) 3/16" x 1-1/2" cotter pins to each side. **ASM-FL-0011.**

NOTE: *Mount cylinder so that hose connections do not interfere when wings are raised and lowered.*

For tractors equipped with a cab, a collar may need to be installed on the lift cylinder rod for proper alignment of the transport lock. Remove the cylinder end and the locking collar. Install the extra collar onto the rod and reassemble. **ASM-FL-0011.**


ASM-FL-0011

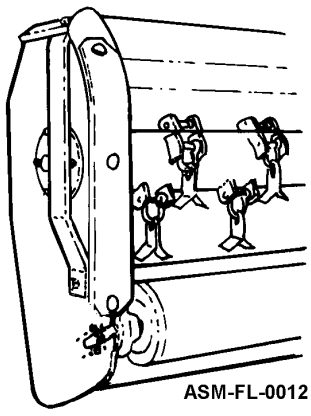
MOUNTING WING MOWERS

Assemble Skid Shoes on Cutter before mounting the head. With the cutter housing tipped up, attach housing shoes/wear plate. Carriage bolt attaches to front mounting hole; plow bolts attach to middle and rear holes. **ASM-FL-0012**

Position the cutter unit so that the outer pivots can be assembled over the pivot pins. Attach the front outer pivot to the lift frame using (4) 5/8 x 2-1/2 bolts and (4) 5/8 locknuts.

Attach switch assembly and rear outer pivot to the lift frame using (2) 5/8 x 3-1/2 bolts and (2) 5/8 locknuts. Install spacer (P/N 107242) between switch assembly and lift arm. **ASM-FL-0013**

Attach magnet assembly to picot pin using bolts and lockwashers provided. **ASM-FL-0014.**


ASM-FL-0012

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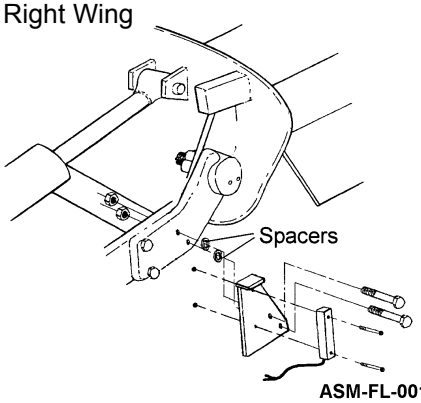
ASSEMBLY

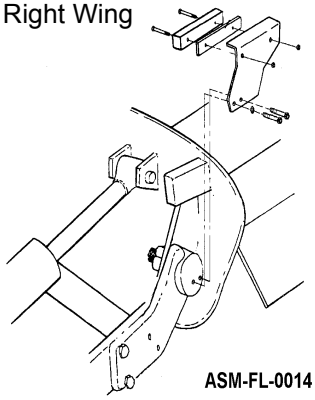
⚠ CAUTION If it is necessary to loosen the nut on the pivot pin. Re-torque the nut to 400 ft labs. Failure to do so will cause the nut to loosen during use, allowing the pin to come out, thereby causing certain machine damage.

Right Wing



ASM-FL-0013

Right Wing

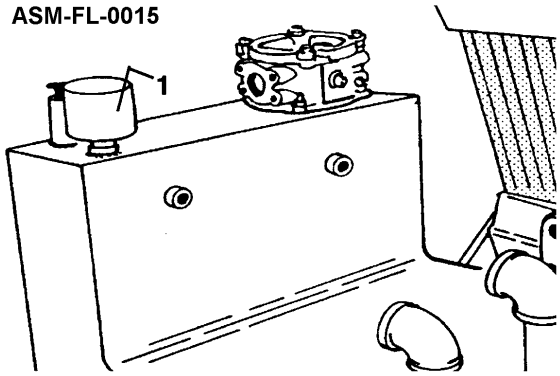


ASM-FL-0014

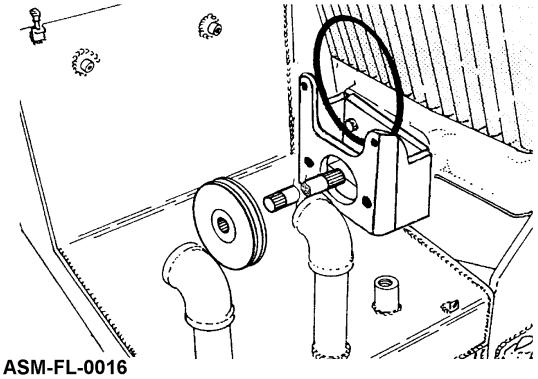
Remove belt guard. Assemble the rod end of the tilt cylinder. Use the pin located in the ears on the end of the housing and secure with the cotter pins. Reinstall belt guard.

Attach the air breather (Item 1) to the hydraulic tank. **ASM-FL-0015**

ASM-FL-0015



Insert driveshaft through the pump mount weldment until it slides into the crank shaft pulley coupling. When using auxiliary hydraulic pump, place the pump drive belt around driveshaft. Place splined pulley weldment on the driveshaft. **ASM-FL-0016**
NOTE: *All splines on driveshaft and pump should have anti-seize applied.*



ASM-FL-0016

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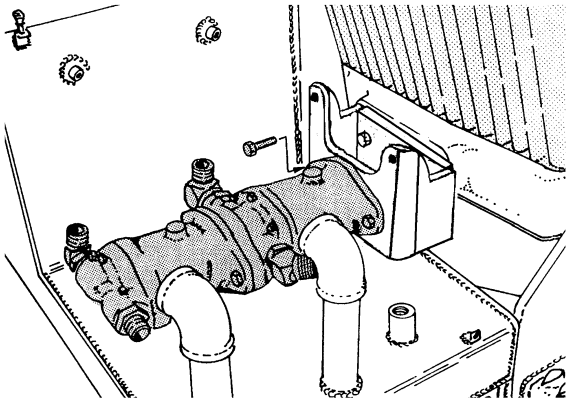
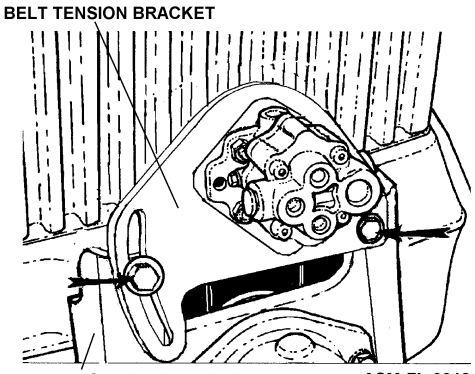
ASSEMBLY

Attach the hydraulic pump assemblies to the pump mount plate with (2) 1/2”x1-1/2” Grade 8 bolts and (2) 1/2” lockwashers. **ASM-FL-0017**

Attach pivot plate to pump mount weldment with (2) 1/2”x1-1/2” bolts, (2) 1/2” flatwashers and (2) 1/2” locknuts. Wrap belt around pulleys, adjust tension and tighten all bolts securely. **ASM-FL-0018.**



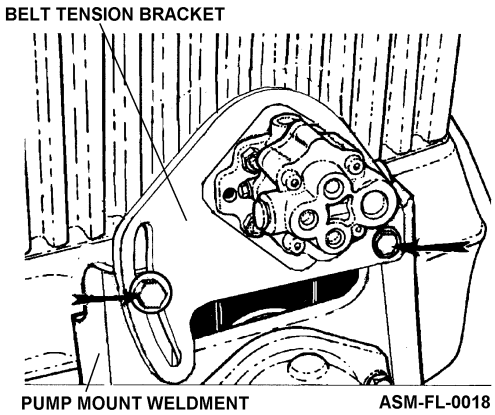
ASM-FL-0017



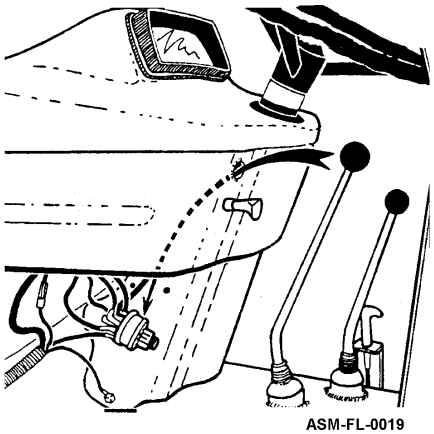
ASM-FL-0018

ELECTRICAL WIRING INSTALLATION

⚠ CAUTION To prevent any damage to electrical system during wiring procedures, temporarily remove the negative lead (ground) from battery terminal. **Asm-R-0018**



ASM-FL-0018



ASM-FL-0019

Remove ignition switch access panel or ignition switch if panels are not provided in dash. Identify the “Ignition-Start” wire and the “Ignition-Accessory” wire. **ASM-FL-0019**

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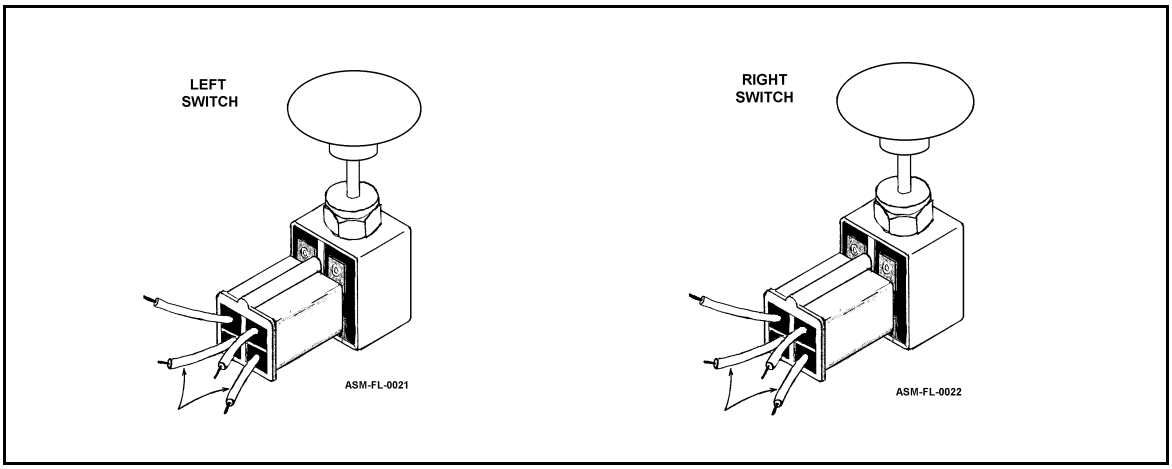
Using the wire identified as “Ignition-Start” leading from ignition switch to starter solenoid, cut wire approximately 3” from ignition switch. Using the internal and external bullet connectors provided, install the “Line-connector” (internal) onto wire at ignition switch which is 3” long. Install the “Bullet-Terminal” (external) onto the wire leading to starter solenoid.



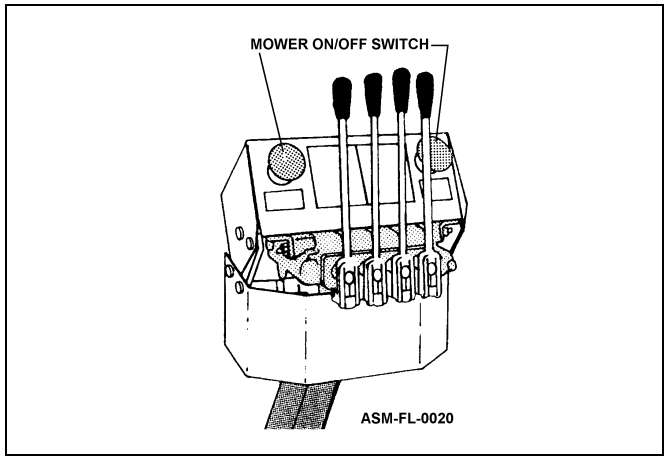
ELECTRICAL CIRCUIT

Using **ASM-FL-20-22** as a guide, install electrical components and wiring.

Wires from the safety switch must be routed close to cutter housing sidesheet and lift frame pivot points. This will prevent wires from being stretched and broken when cutter housing is raised or lowered to maximum positions.

NOTE: *Route wires in such a manner to prevent interference with the operation of tractor or INTERSTATER. Ensure that wires DO NOT lay against anything which could wear through insulation and cause a short circuit.*

After connecting all wires, wrap wires with flexguard tubing. Neatly gather hydraulic hoses and flexguard tubing and strap together using plastic ties.



NOTE: *Be sure to install connector so that larger brown wires are located on bottom poles of switch. This applies to Dual Wing and Single Wing applications.*

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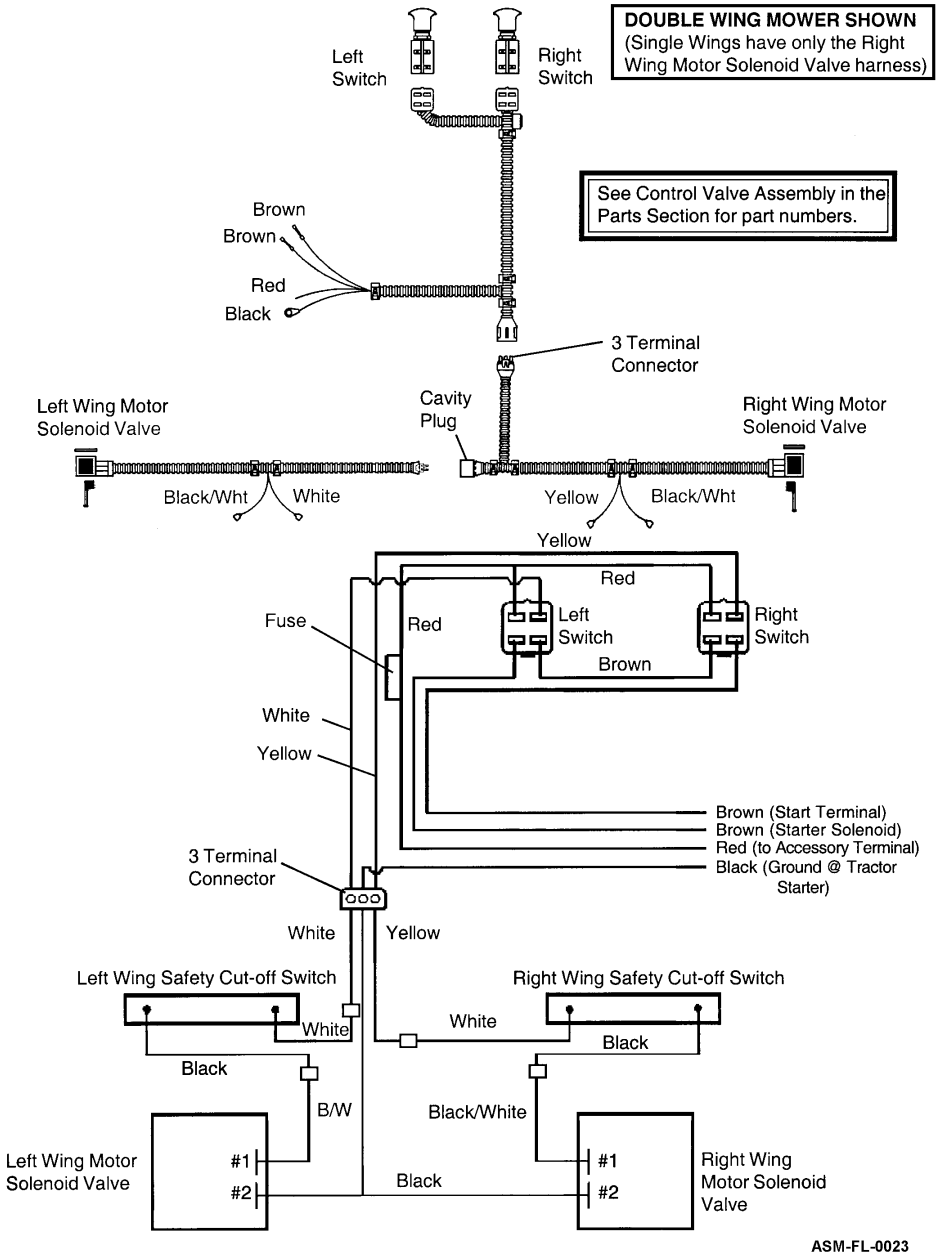

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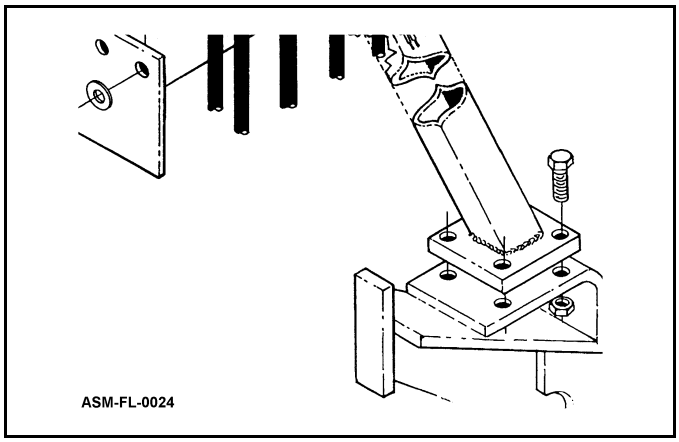
CONTROL VALVE

Attach valve stand to the top of the right lift cylinder support with (3) 1/2” x 1-1/2” bolts, and (3) 1/2” locknuts. **ASM-FL-0024**



Attach valve stand to the valve mount bracket with (2) 3/8”x1-1/4” bolts and (2) 3/8” locknuts. **ASM-FL-0025**

Attach control valve to the valve stand with (2) 3/8”x1” bolts, (2) 3/8” locknuts. Attach the top cover and the bottom cover to the valve mount bracket with (8) 3/8”x1” bolts, (8) 3/8” washers and (8) locknuts. **ASM-FL-0026**

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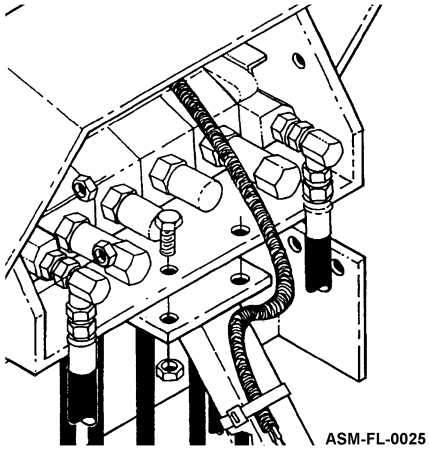

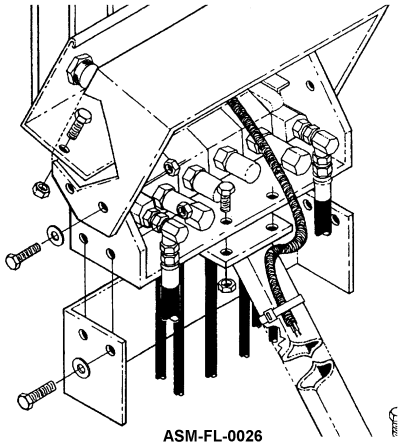

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ASSEMBLY

HYDRAULICS

⚠WARNING Refer the Tractor Manual when connecting hydraulic hoses to the tractor hydraulic system. Not only does the installation procedure vary from tractor to tractor, but numerous precautions should be taken due to the possibility of a pressure buildup within the hydraulic circuit. Relieve the pressure before opening or entering the circuit. FLUID ESCAPING UNDER PRESSURE CAN PENETRATE THE SKIN CAUSING SERIOUS INJURY. Ensure that hose fittings are secure before pressurizing the hydraulic systems.

Important Once pumps and belts are installed, DO NOT start the tractor (which will turn pumps) unless both power circuits are filled with the specified hydraulic fluid. Running pumps without oil will cause non-warrantable damage.

It is important that pipe thread sealant be used only on solid connections of pipe thread; never on connections between swivel fittings and solid male pipe threads or on straight thread "O" ring fittings. Use the pipe thread sealant supplied. Do not substitute with some other type of sealant, i.e., teflon tape, paint, shellac, etc.

Hoses supplied have two types of fittings; solid or swivel. Some hoses have solid fittings on both ends; others have a solid fitting and a swivel fitting. Hoses with two solid fittings will fit into either a female solid thread, or a swivel adapter union. When installing either type hose, solid fittings must be installed first, then install the swivel end of the hose.

The INTERSTATER hydraulic system incorporates three basic types of hydraulic fittings:

a. Standard pipe (NPT or NPTF) thread fittings. This type requires a small amount of evenly-applied sealant.

b. Swivel fittings. This type does not require any sealant on the swivel end because it seals against an internal flare.

c. “O” Ring fittings. This type does not require any sealant on the “O” Ring end of the fitting.

It is extremely important to avoid getting pipe thread sealant inside the fittings or hoses. KEEP THE INTERIOR OF ALL HYDRAULIC COMPONENTS SURGICALLY CLEAN. Inspect the inside diameter of each hose before assembly. Ensure that no obstruction is present. Dirt, sand, dust, etc., are abrasive and once in the system can cause immediate or early failure.

POWER CIRCUIT

Using the following drawing and your installation drawing as a guide to install the hydraulic hoses and fittings for the power circuit. The power circuit drives the Interstater wing cutter units. The control circuit (for lift and tilt) will be assembled later.

NOTE: *Do not strap hoses together until all hoses and wiring are connected. Hoses and wiring should be routed so they do not lay on moving parts, too close to sharp edges, or near excessive heat.*

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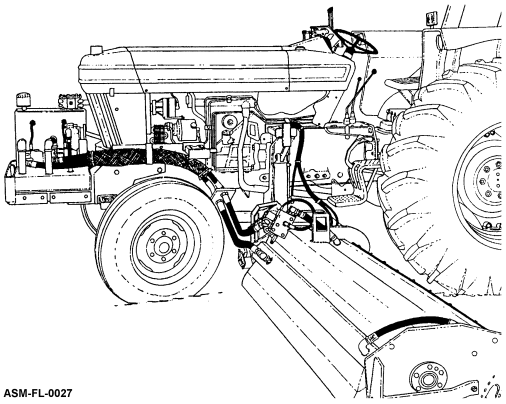
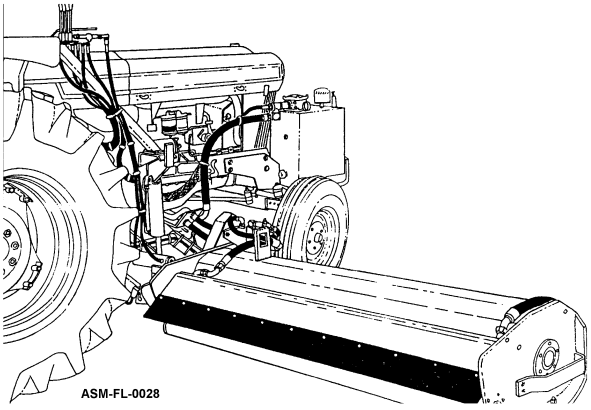
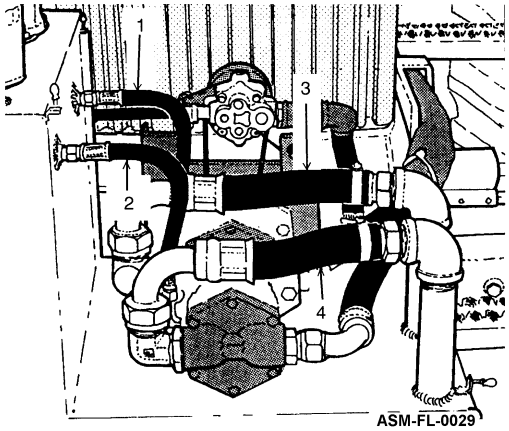

ASM-FL-0027


ASM-FL-0028

1. Attach the two Pump Case Drain hoses p/n 001788 (Item 1 and 2) from the Hydraulic Pump to the Hydraulic Tank. **ASM-FL-002**9
2. Attach the two Suction hoses p/n 001783 (Items 3 and 4) from the Hydraulic Pump to the vertical suction tubes on the hydraulic tank. **ASM-FL-0029** Fit hoses and cut to length so that there is no kink after they are installed.
3. Attach the left wing pressure hose (Item 1) to the first Hydraulic Pump. **ASM-FL-0030**
4. Attach the right wing pressure hose (Item 2) to the second Hydraulic Pump. **ASM-0030**
5. Slide the Protective Sleeving (Item 3) over these hoses. **ASM-FL-0030 & 0031**



ASM-FL-0029

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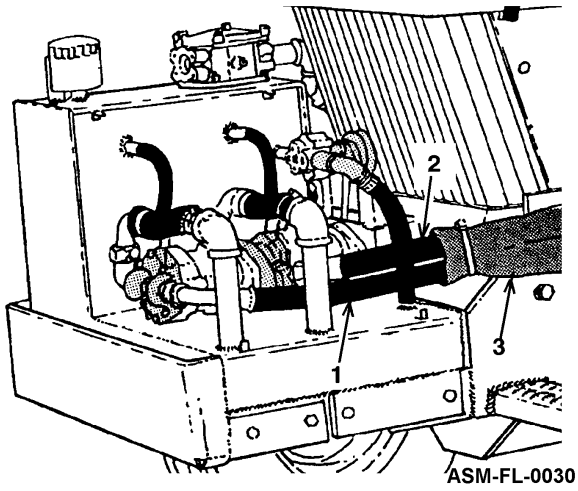
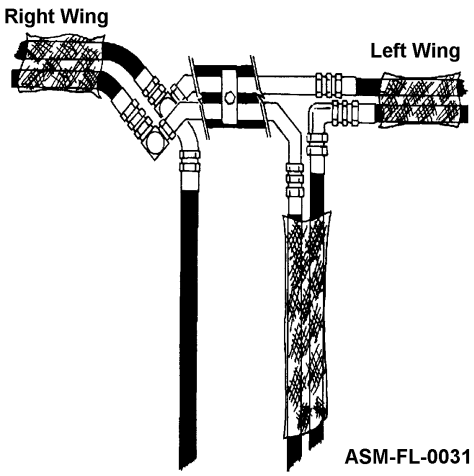
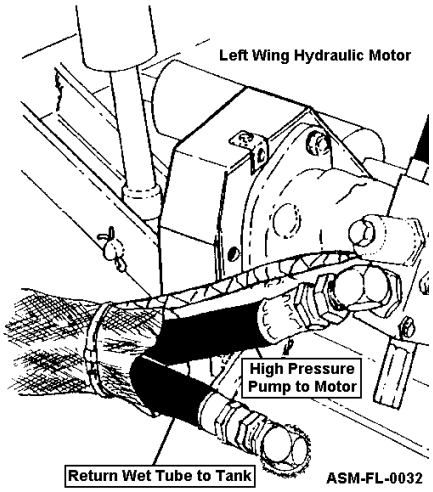
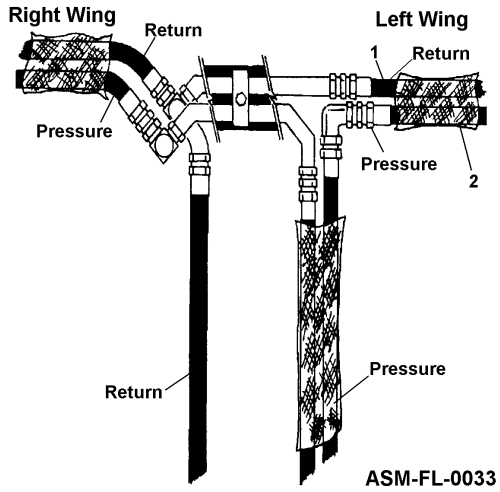




6. Attach the Return Hose (Item 1) to Left Wing **ASM-FL-0032 & 0033** Slide Protective Sleeving (Item 2) over the Return Hose.





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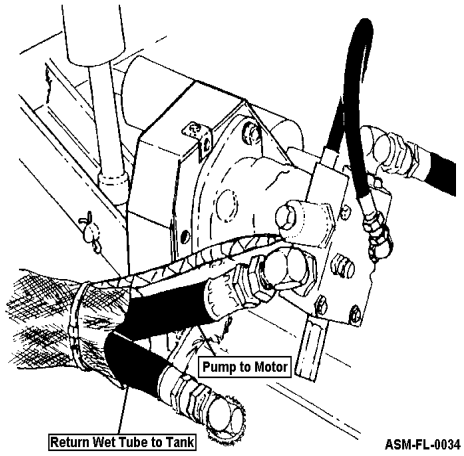
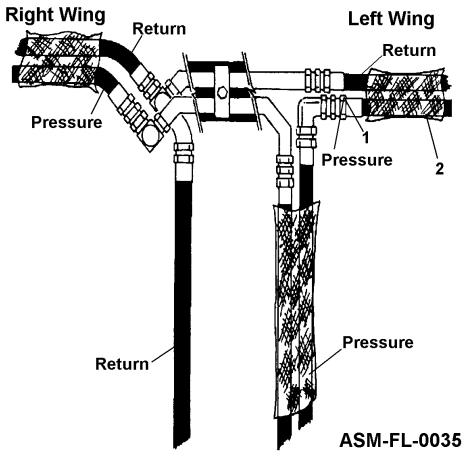
Slide the left wing pressure hose (Item 1) through the protective sleeving (Item 2) and attach to the left wing hydraulic motor. **ASM-FL-0034 & 0035**





Slide right wing pressure hose (Item 1 **ASM-FL-0036 and 0037**) through protective sleeving (Item 4 **ASM-FL-0037**) and attach to right wing hydraulic motor.

Attach right wing return hose to hydraulic adapter (Item 3) on right wing (Item 2 **ASM-FL-0036**) and slide through the sleeving. This sleeving will now have both right wing pressure hose and right wing return hose. **ASM-FL-0037**

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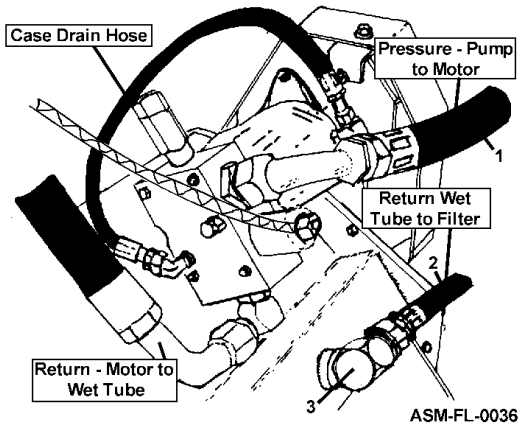

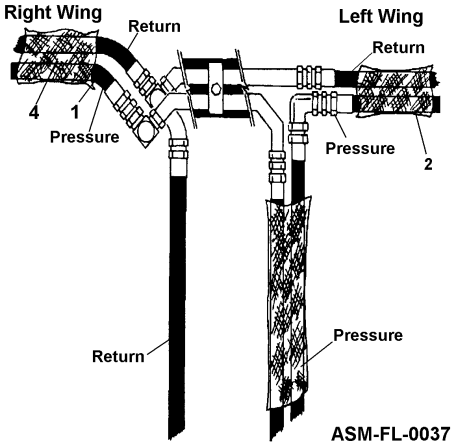

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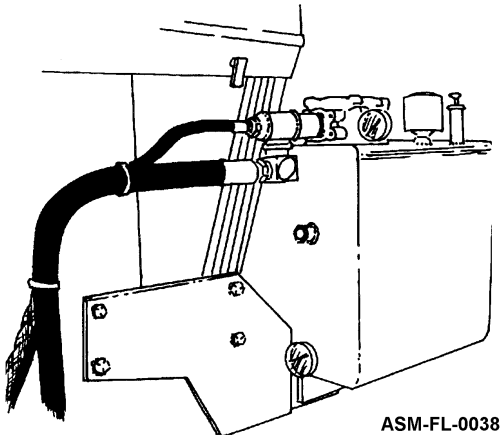
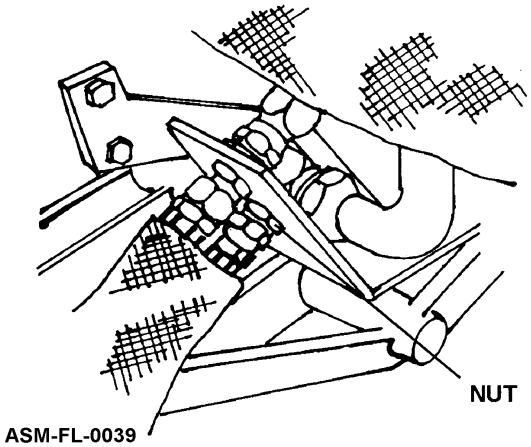
ASSEMBLY

Attach the return hose to the return filter on the hydraulic tank. **ASM-FL-0038** Attach the other end of the return hose to the 3-way fitting on the hard plumbing. **ASM-FL-0039**

NOTE: *the nut on the 3-way fitting must be loosened before the return hose can be attached.* ***ASM-FL-0039***



ASM-FL-0038

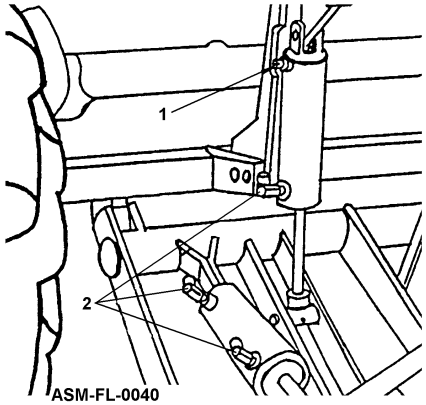


ASM-FL-0039

Install the vent plug P/N 000696 (Item 1) **ASM-FL-0040** plug into upper port of each lift cylinder

NOTE: *On some model, lift cylinder ports must face forward for proper hose clearance.*

Install the 90 deg. elbow fittings P/N 02045200 (Item 2) **ASM-FL-0040** into the remaining lift and tilt cylinder ports



ASM-FL-0040

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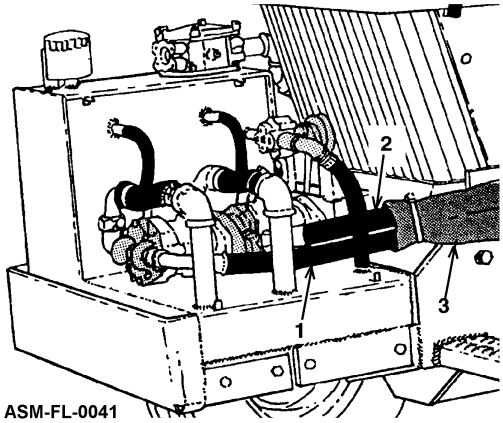
Attach suction hose (Item 1) **ASM-FL-0041** from auxiliary pump to hydraulic tank.



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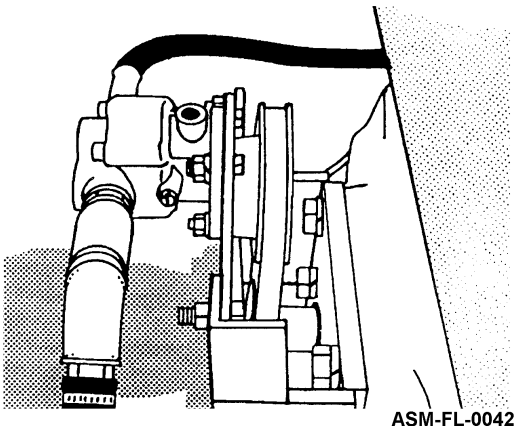
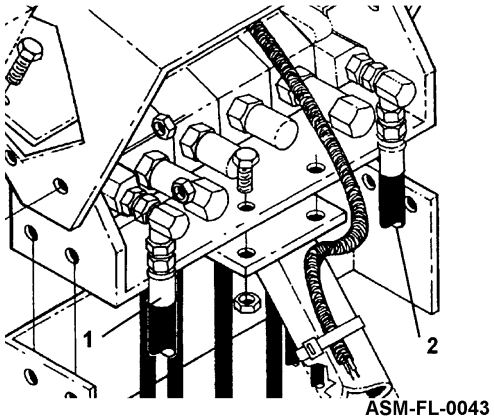

ASM-FL-0042

Attach the pressure hose (Item 1) ASM-FL-0042 from the auxiliary pump to the control valve (Item 1) ASM-FL-0042

Attach the return hose (Item 2) ASM-FL-0043 from the control valve to the return filter on the hydraulic tank (Item 1) ASM-FL-0044.



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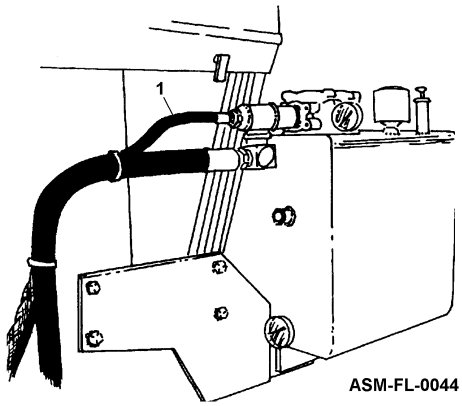

ASM-FL-0044

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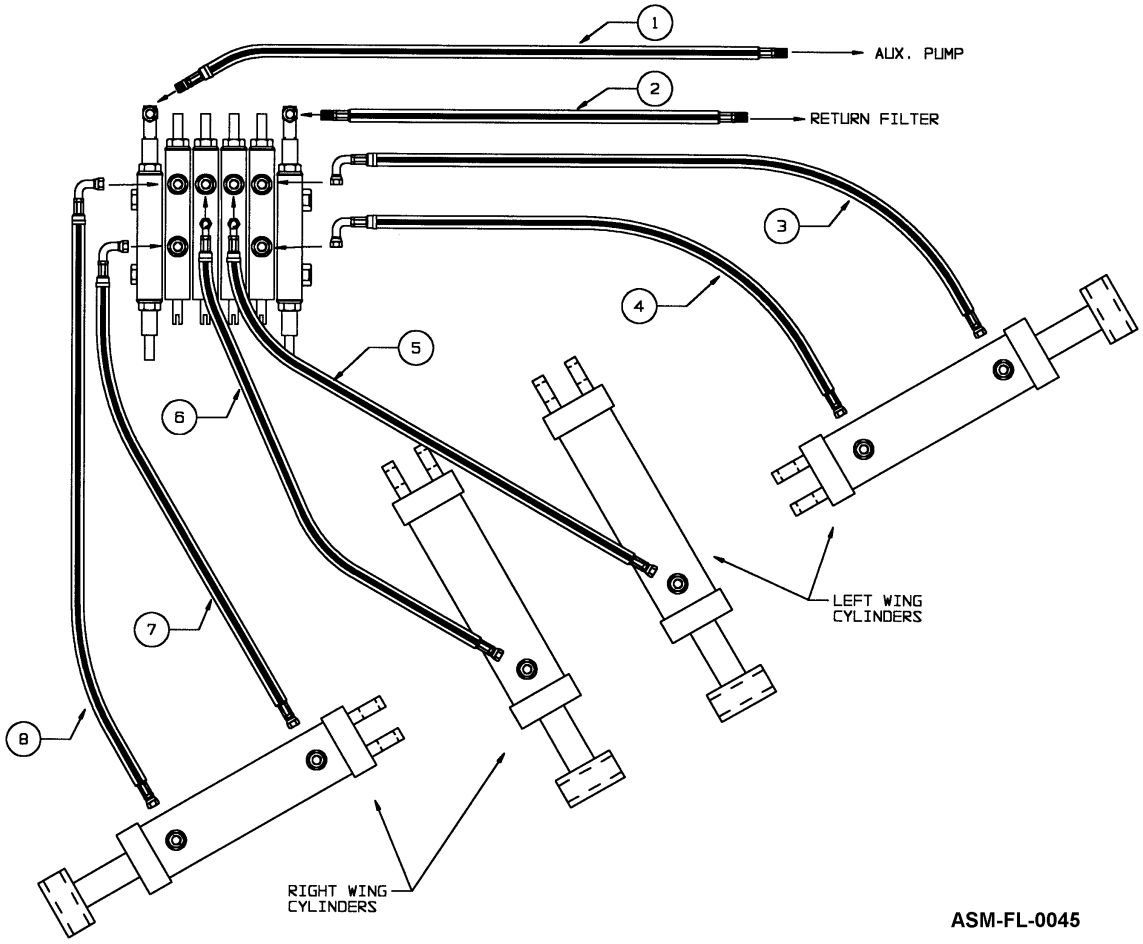
ASSEMBLY



ASM-FL-0045

ITEM	PART NO.	QTY	DESCRIPTION
8*	001775	1	Hose - Control Valve to Pump
7*	001776	1	Hose - Control Valve to Return Filter
6+	001773	1	Hose - Control Valve to Tilt Cyl. - Live End
5+	001774	1	Hose - Control Valve to Tilt Cyl. - Dead End
4+	001772	1	Hose - Control Valve to Lift Cyl. - Live End
3+	001771	1	Hose - Control Valve to Lift Cyl. - Live End
1+	001770	1	Hose - Control Valve to Tilt Cyl. - Dead End
2+	001770	1	Hose - Control Valve to Tilt Cyl. - Live End

\+ Hose used with most non-cab tractors

* See Installation Instructions that were shipped with your unit for proper replacement part numbers.

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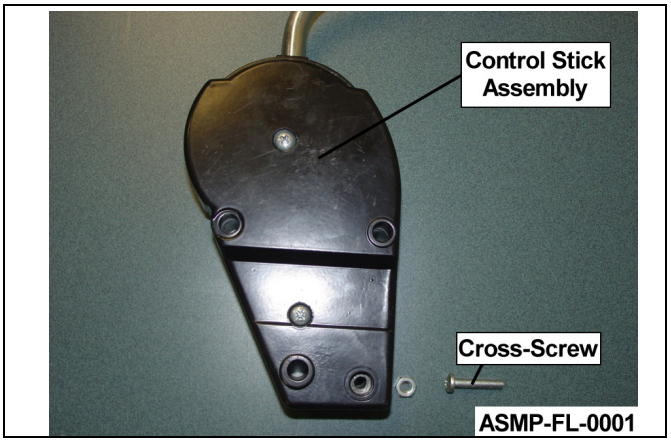
CONTROL CABLE CONNECTION TO CONTROL STICK ASSEMBLIES

First remove the Cross-Screw from the bottom of the Control Stick Assembly. DO NOT remove the screws that fasten the two housings halves together. **ASMP-FL-0001**

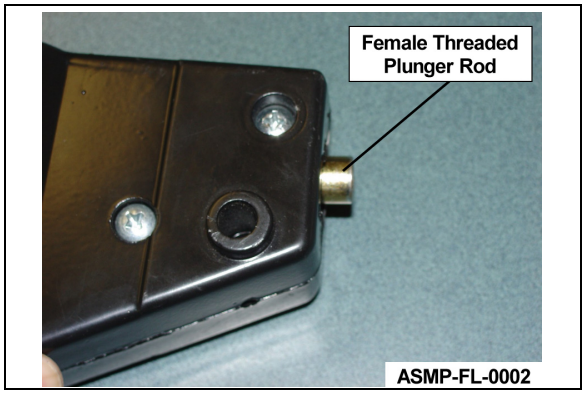


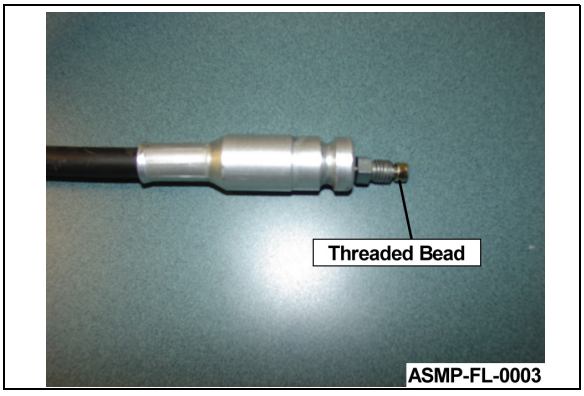
Next while holding the housing, fully shift the Handle in the Control Stick Assembly to expose the female-threaded end of the Plunger Rod. **ASMP-FL-0002**

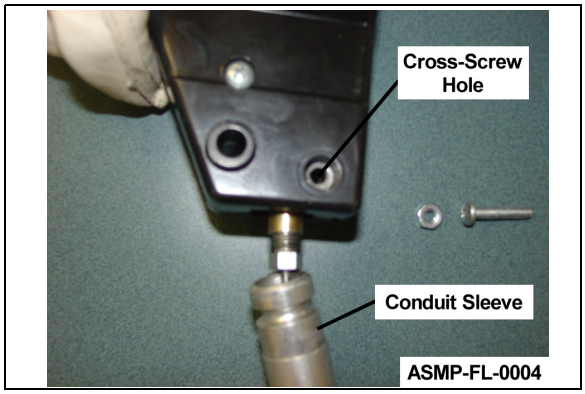
Then while holding the Handle to expose the Plunger Rod, thread the Threaded Bead **ASMP-FL-0003** of the Cable into the end of the Plunger Rod and tighten securely. Release the Handle, allowing the Cable to pull into the Control Stick Assembly.

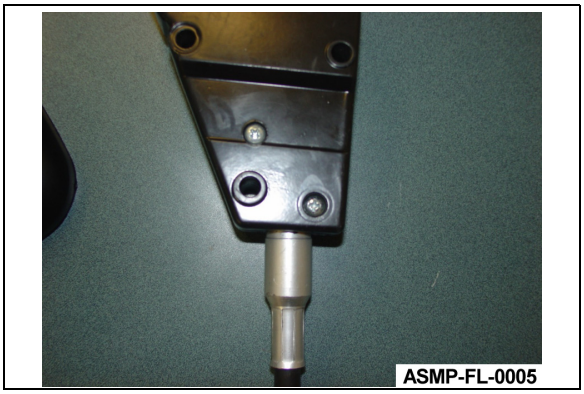
Once Cable is attached to Plunger Rod, slide the silver Conduit Sleeve **ASMP-FL-0004** into the bottom of the Control Stick Assembly and align the groove in the Conduit Sleeve with the Cross-Screw Hole.

Finally Reinstall the Cross- Screw and tighten securely.









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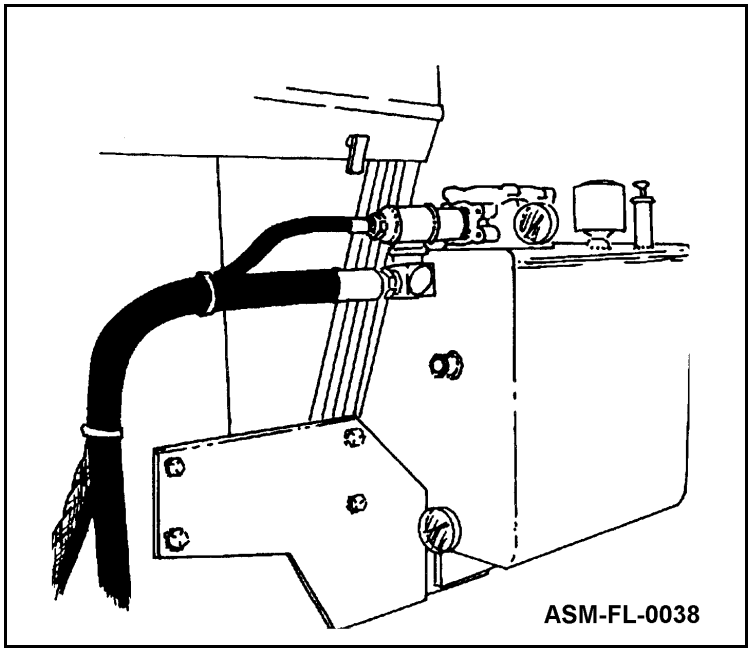
INITIAL START-UP PROCEDURE

1. Check all nuts and hex head capscrews to ensure all are tight and all lock washers are fully compressed (flattened).
2. Check all hoses and hydraulic connections. Make certain they are secure.
3. Inspect all moving parts and be sure that no wires or hoses will be caught or pinched when the tractor or the INTERSTATER is in operation. Tie down loose wires and hoses.
4. Thoroughly grease the INTERSTATER and install a lubricap on each grease fitting. Refer to the Operation and Maintenance Section.
5. Jack front of tractor up enough to allow axle to pivot through its full range. While turning wheels through their limits, right and left, swing them up and down. Look for interference between tires and any part of the INTERSTATER. If interference occurs, shims (not furnished) must be welded to axle pivot stop or steering arm to limit the movement enough to avoid interference. Tractors with an adjustable front axle may require an outward adjustment of the wheels.
6. To fill the INTERSTATER reservoir with new, clean hydraulic oil, follow the steps below. Refer to the Operation and Maintenance Section for specifications.

a. With a hydraulic jack raise the right side of the tractor. This will tilt the tank and allow only a minimum amount of air when filling.

b. Avoid hydraulic contamination by filtering the hydraulic oil while filling the hydraulic tank. **ASM-FL-0038**



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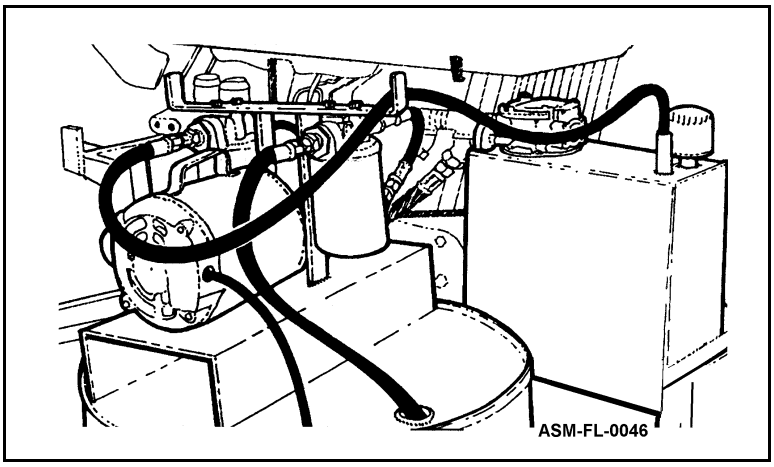
Filter buggies or carts are commercially available for hydraulic system clean-up. These consist of a high-efficiency, high-capacity filter, a circulating pump, a drive motor, and hoses for connecting the overhauled machine's hydraulic system. **ASM-FL-0048**



After the first 10 hours of operation, replace the hydraulic filter with a new one. An extra Filter Element is provided for you. Refer to the Operation and Maintenance Section for instruction.

7. After the Interstater mower is completely assembled to the tractor and with the wings on the ground, fill the mower hydraulic tank above the oil level sight gauge approximately 5" or 1" below the top of the tank.

8. With mower ON/OFF switches in "ON" position and tractor fuel cut off, crank engine for about 30 to 45 seconds to allow oil to fill pumps and motors. Check the oil level in the sight gauge. If no oil is seen add oil to bring the level up to the sight gauge. ***NOTE:*** *Do not fill the tank with oil above the level of the sight gauge.* Over filling the tank with oil after the initial filling may result in oil being discharged through the air filter on top of the hydraulic tank. Start the tractor and run it for 2 minutes and then turn it off. Again check the oil level in the sight gauge. If the oil level is in the sight gauge, the unit is ready to run. If no oil is seen, add oil to bring the level up to the sight gauge.

⚠ CAUTION Remove all foreign objects and stand clear of cutter units. DO NOT GET NEAR ROTATING KNIVES!

NOTE: *On tractor hydraulic powered circuit only, make certain that there is full flow from tractor hydraulic system to control valve. Refer to tractor manual.*

9. After hydraulic system is fully charged and functioning properly, switch cutter units on, then speed engine up to 540 RPM PTO speed. Maintain this speed for about 5 minutes. Check complete INTERSTATER, look for any leaks, loose connections, or anything that could cause premature wear or failure.

FINAL CHECK

Run INTERSTATER for about 1/2 hour at full speed. Check for leaks and vibrations. Frequently check oil temperature. Make certain it does not exceed 180 deg.

NOTE: *When raising wings, make certain there is no interference with mower, frame, cylinders or tractor. Lift wings slowly.*

⚠ CAUTION DO NOT leave unit unattended, and COMPLY WITH ALL WARNING DECALS.

If unit starts to make unusual noise, stop unit and check oil level. Also check for frothy oil which would indicate a leak on suction side of system.

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ASSEMBLY

INSTALLATION OF REAR MOWER

Before attaching mower to tractor, it will be necessary that each tractor lower hitch arm has freedom of movement so that the mover is completely independent of tractor movement. This will allow the mower to pivot sideways as well as move vertically.

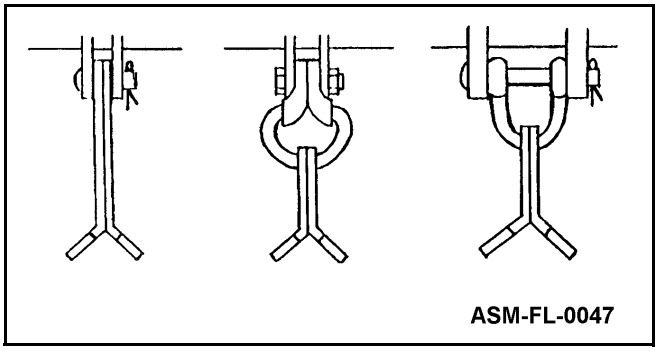
Some tractors provide this “float” by means of an optional slot in the lower end of each lift link, others by lift links which can be made telescopic by changing the position of the pins in the links. Failure to provide “float” may result in failure of the cutterhousing and bearings in the roller, thus voiding the mover warranty. Should your tractor not have a built in “float” option, a flexible lift chain assembly will be required.

On all centered mowers, two flexible lift chain assemblies will be necessary to provide “float” to each lift link.

On all offset mowers, one flexible lift chain assembly will be necessary to provide “float” to the lift link on the same side that the mover is offset. The other lift link should be the adjustable stiff link furnished with the tractor.

After the mower is attached to the tractor’s 3-point hitch, but before the universal slip joint is installed, and with the mover on the ground, adjust the top link of the hitch to make the mower gearbox input shaft parallel to the tractor P.T.O. shaft. This relationship provides optimum operation of the universal joints in the driveline. Driveline that is not parallel to PTO will result in vibration due to the characteristic of a universal joint that results in the output end speeding up and slowing down twice each revolution of the universal jointed shaft. Adjust the top link whenever the cutting height is changed.

1. Tip cutterhousing back and place a block under roller to safely support unit. Remove shipping skids and drive pulley side belt guard fender. If necessary, install knives, as shown, one row at a time. ALL KNIFE PINS ARE INSTALLED WITH THEIR HEADS FACING AWAY FROM THE CUTTERSHAFT PULLEY. This will locate cotter pins where knives cannot reach them when flexing backward. The housing side sheet has a hole in it which allows knife pins to be inserted into end lugs from outside the cutterhousing. After the cotter pin is installed, bend extended prong at a 45 Degree angle with prong parallel to lug. **ASMP-FL-0047**



ASM-FL-0047

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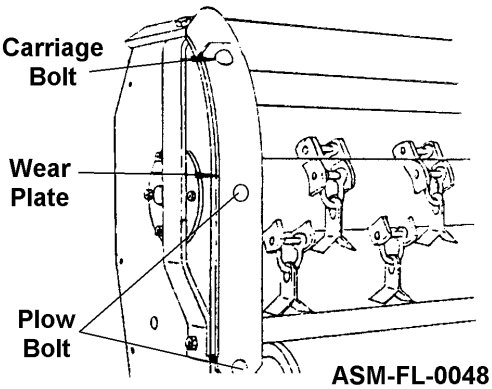
ASSEMBLY

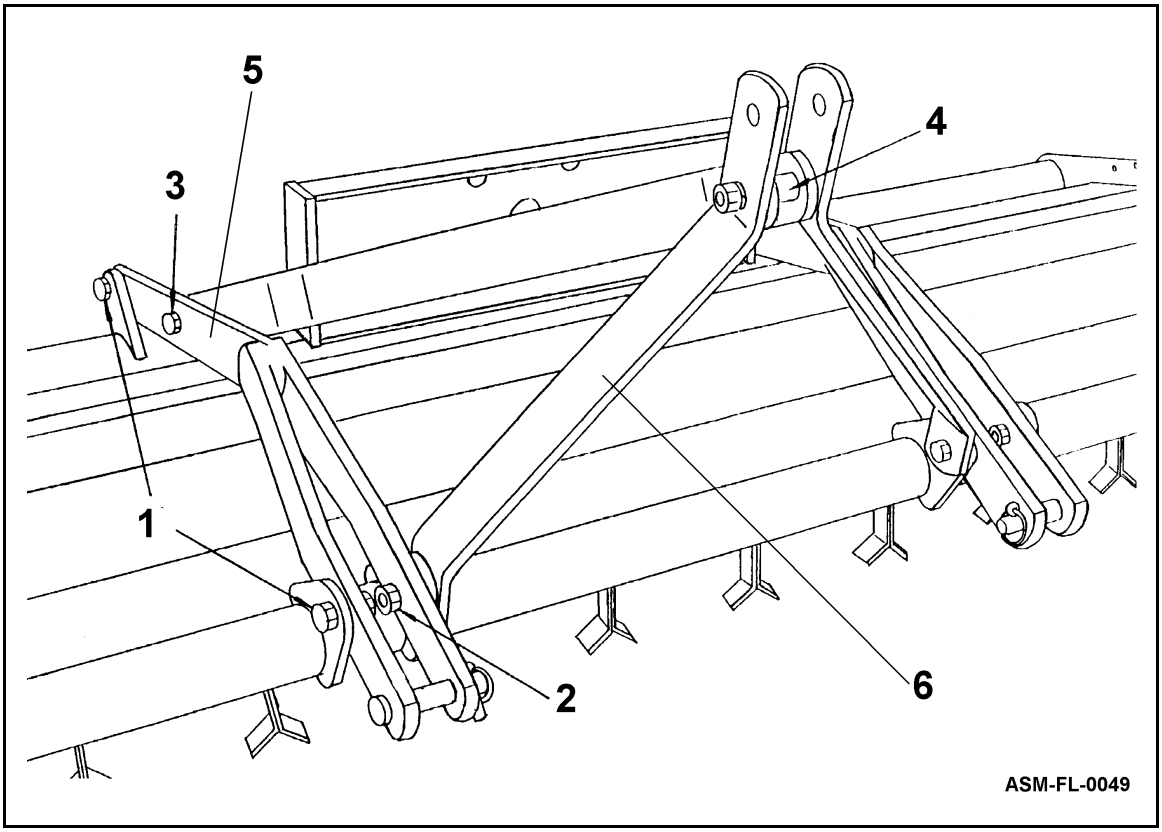
With the cutterhousing tipped up, attach housing shoes/wearplate. Carriage bolt attaches to front mounting hole; plow bolts attach to middle and rear holes.



1. Attach overarms to cutterhousing. Secure each in 2 places with 5/8 NC x 1-3/4 Hex Head Capscrew(#1), and nut.
2. Attach “A” frame arms to front of cutterhousing. Secure each, plus overarms in place with 5/8 NC x 2-1/2" HHCS, and nut(#2).
3. Attach gearbox mounting frame to overarms and A- frame arms. **ASM-FL-0049**

a. Secure with 5/8 NC x 1-3/4 HHCS and nut (#3). Torque to 170 ft-lbs.

b. Secure with 3/4 NC x 3-3/4 HHCS, A- frame spacer and nut(#4). Torque to 300 ft-lbs.



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ASSEMBLY

1. Attach outboard bearing plate to cutterhousing.

FORWARD ROTATION (Bearing plate mounts on left side of cutterhousing.)

a. Secure with 3/8 NC x 7/8 HHCS and nut at front mounting hole. Torque to 35 ft-lbs. (Typ.)

b. Secure with 3/8 NC x 2-1/4 HHCS, nut, lock washer, and second nut at rear mounting hole. The HHCS is used as an anchor for the idler arm spring.

REVERSE ROTATION (Bearing plate mounts on right side of cutterhousing)

a. Secure with 3/8 NC x 2-1/4 HHCS, nut and second nut at front mounting hole. The HHCS is used as an anchor for the idler arm spring.

b. Secure with 3/8 NC x 7/8 HHCS and nut at rear mounting hole.

2. 2. Install gearbox & extension shaft assembly and PTO shield mounting bracket

a. Remove existing nuts and lock washer from bearing housing.

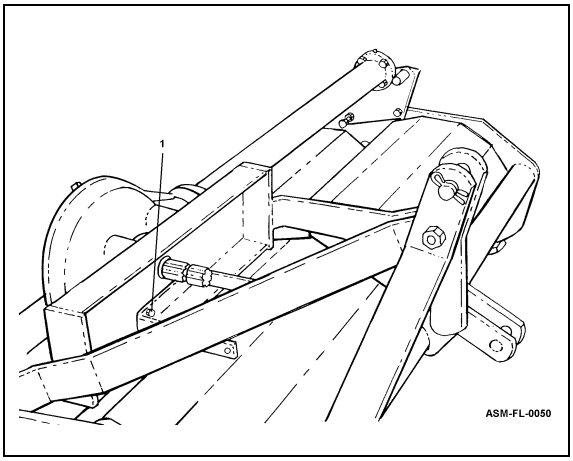
NOTE: *On forward rotation units, remove only the lower two fasteners.*

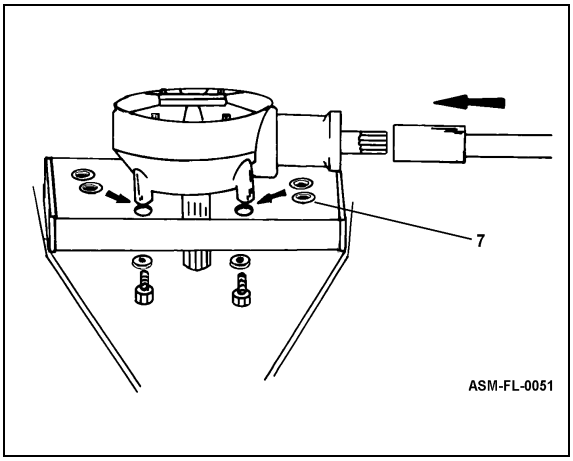
b. Slide bearing housing HHCS into proper holes in outboard bearing plate.

c. Attach gearbox and mounting bracket to gearbox mounting frame. Secure with 5/8 NC x 1-1/4 HHCS (upper gearbox feet), and 5/8 NC x 1-1/2 HHCS (lower gearbox feet) and Lockwashers. Torque to 170 ft-lbs. (Typ.)

Important

If extension shaft does not line-up with Gearbox, it may be necessary to shim gearbox mounting lugs. To accomplish this, insert one gearbox retaining bolt (Item 1), **ASM-FL-0050** thru the mount plate and into the gearbox housing. Do not tighten this bolt (it should have at least 1/4" free threads to move in and out). Assemble the gearbox, shaft, shaft extension tube and the bearing to the bearing retainer plate mounted on the side sheet. Tighten all fasteners except the one bolt in the gearbox mounting plate. Check the distance between the gearbox mounting lugs and the mount plate. If required, insert shims from shim kit (P/N 000552), **ASM-FL-0051** between gearbox mounting lugs and mounting plate to insure the gearbox pulls up evenly on the mounting plate.





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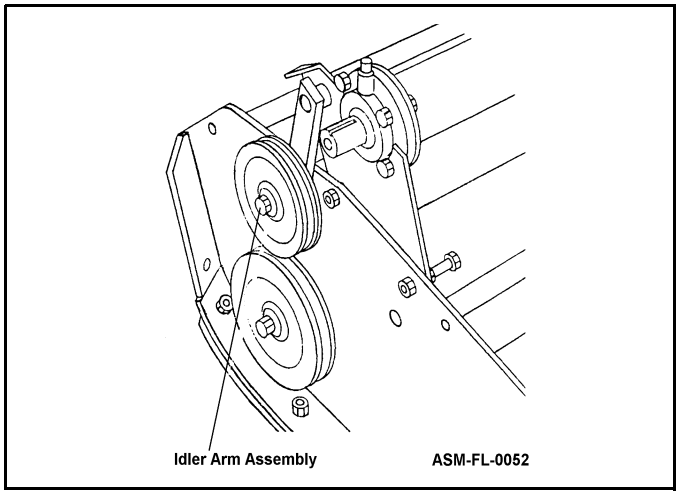
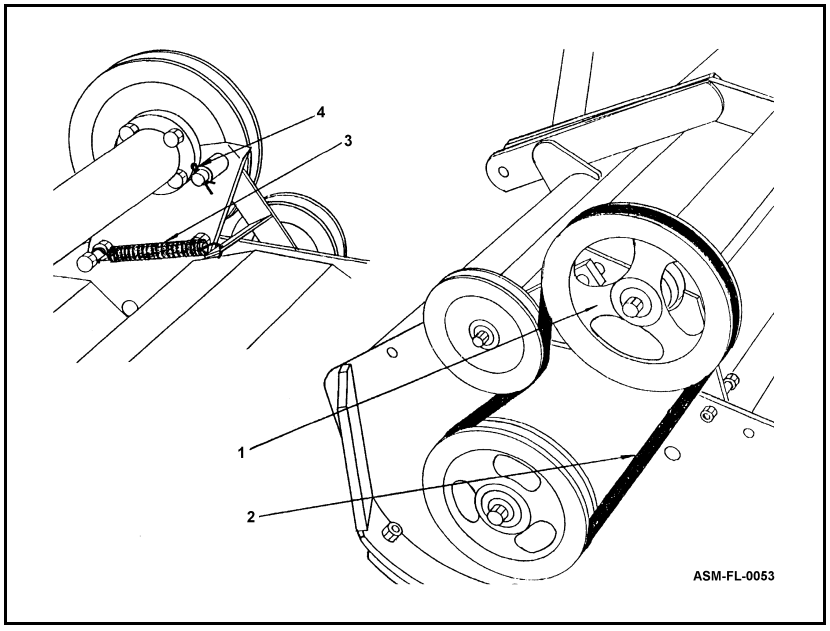
Install idler arm assembly to bearing plate. Do not secure at this time. **ASM-FL-0052**



3. Remove fasteners and shaft protector from end of drive shaft and retain. Lightly grease shaft. Install key and driveshaft pulley. Do not secure at this time.
4. Align all three pulleys. Use spacers and shims provided to achieve alignment, then secure idler arm assembly with cotter pin #4. Secure driveshaft pulley #1 with fasteners that were retained during previous step.
5. Install drive belt #2.
6. Attach spring. One end is inserted in idler arm spring arm hole; the other end is attached to the long outboard bearing plate capscrew.



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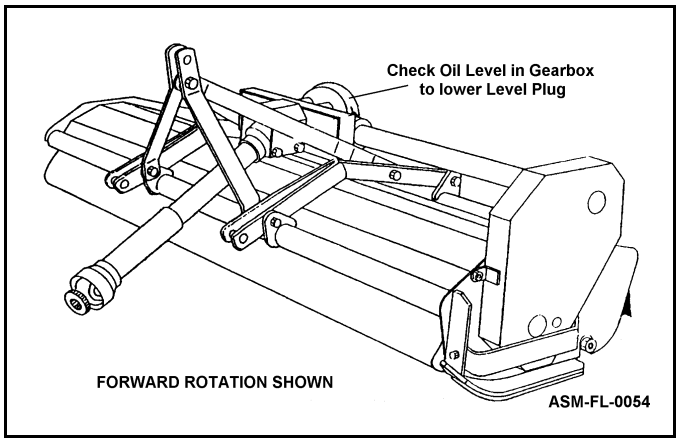
ASSEMBLY

1. Properly mount rear mower to tractor and install driveline. See INSTALLATION AND DRIVELINE SECTIONS.
2. Attach PTO shield to mounting bracket. Snap-on shield is positioned so lower ears engage holes in bracket; upper ears rest on top of bracket. Bolt-on shield is secured with 3/8 NC x 3/4 HHCS (4 places).
3. Attach belt guard to cutter housing then reattach belt guard fender.

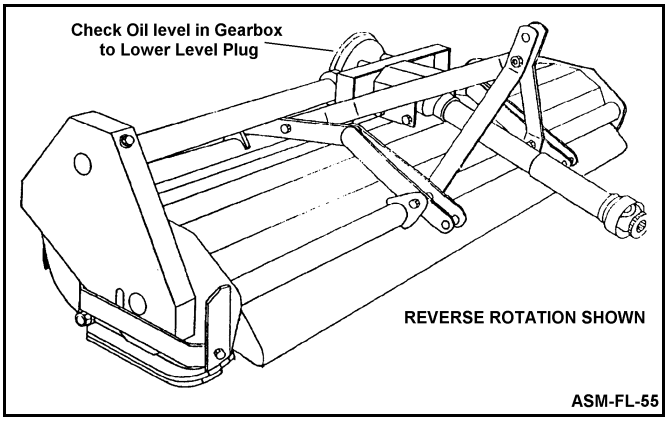


Belt Guard, FORWARD ROTATION

Three 1/2 NF x 1-1/4 HHCS and nuts.

Belt Guard, REVERSE ROTATION

One 1/2 NF x 1 HHCS (upper attaching pollinator 1/2NF x 1-1/4 HHCS two plain washers, and one nut. Plain washers are located at upper two belt guard attaching points.



UNIVERSAL SLIP JOINT (PTO SHAFT): Refer to instructions supplied with shaft.

To install the driveline separates slip joint halves, then install them onto mower gearbox input shaft and tractor PTO driveline according to illustration on PTO shaft shield. Hold halves side by side, then raise and lower the mower to determine that there is no interference between halves when in the shortest position, and that there is a specified minimum amount of overlap (see PTO SHAFT - PARTS LIST section) when in the longest position. Once it is determined that the shaft will cause no clearance problems, remove the halves, rejoin them and install the assembled PTO shaft between the tractor and the mower.

After attaching PTO shaft, slowly raise and lower mower to make sure shaft will not make any contact with “A-Frame” or mower head. If a problem exists, change mounting position or lengths of lift chains by removing or adding links.

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OPERATION SECTION

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OPERATION

ALAMO INDUSTRIAL INTERSTATER OPERATING INSTRUCTIONS

Alamo Industrial Interstater flail mowers are manufactured with quality material by skilled workers. These mowers are designed for cutting grass and small weeds. The mower is equipped with protective deflectors to prevent objects being thrown from the mower by the blades, however, no shielding is 100% effective. All shields, guards, and deflectors equipped on the mower must be maintained in good operational condition.

It is the operator's responsibility to be knowledgeable of all potential operating hazards and to take every reasonable precaution to ensure oneself, others, animals, and property are not injured or damaged by the mower, tractor, or a thrown object. Do not operate the mower if passersby, pets, livestock, or property are within 100 yards of the unit.

This section of the Operator's Manual is designed to familiarize, instruct, and educate safe and proper mower use to the operator. Pictures contained in this section are intended to be used as a visual aid to assist in explaining the operation of a Interstater flail mower and are not specific to any model. Some pictures may show shields removed for picture clarity. NEVER operate implement without all shields in place and in good operational condition. The operator must be familiar with the mower and tractor and all associated safety practices before operating the mower and tractor. Proper operation of the mower, as detailed in this manual, will help ensure years of safe and satisfactory use of the mower.

Important To avoid mower damage, retorque all bolts after the first 10 hours of operation. Refer to the Torque Chart at the end of the Maintenance Section to ensure bolts are properly tightened.

READ AND UNDERSTAND THE ENTIRE OPERATING INSTRUCTIONS AND SAFETY SECTION OF THIS MANUAL AND THE TRACTOR MANUAL BEFORE ATTEMPTING TO USE THE TRACTOR AND IMPLEMENT. If you do not understand any of the instructions, contact your nearest authorized dealer for a full explanation. Pay close attention to all safety signs and safety messages contained in this manual and those affixed to the implement and tractor. *OPS-U- 0001*

READ, UNDERSTAND, and FOLLOW the following Safety Messages. Serious injury or death may occur unless care is taken to follow the warnings and instructions stated in the Safety Messages. Always use good common sense to avoid hazards. (SG-2)

PELIGRO Si no lee ingles, pida ayuda a alguien que si lo lea para que le traduzca las medidas de seguridad. (SG-3)

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1. Standard Equipment and Specifications

Base Unit Specifications
16’5”,18’5”, or 20’9” Overal Cutting Widths
Full-Length Welded Tubular Frame With Transport Lock
19-Gallon Reservoir with 12 Micron Filtration
Tandem Piston Pumps Rated @ 48 GPM @ 3800 PSI(Dual Interstater)
Tandem Piston Pump Rated @ 24 GPM @ 3800 PSI(Right & Left Hand Interstater)
4-Spool Valve with Detent Position (Dual Wing Interstater)
2-Spool Valve with Detent Position (Right & Left Hand Interstater)
Wing Mower Specification
62”. 74”, or 88” Cutting Widths
1/2” Inboard & 5/16” Outboard Side Plates
Replaceable Skid Shoes
4-1/2” x 5/16” Wall Cuttershaft
1-5/16” Bore Greasable, Self-Aligning Cuttershaft Bearings
53 HP Piston Motor
Belt Drive From Motor to Cuttershaft with Automatic Spring Tension
6” Adjustable Rear Roller
1/2” to 6” Cutting Height
Available in Fine or Coarse-Cut
Front and Rear Safety Deflectors
Automatic Cut-Off Switch
Lift Cylinder Capable of 14” Vertical Lift
Tilt Cylinder Capable of 45 Degrees Down & 90 Degrees up
10 Gauge Unitized Cutter Housing
Rear Mower Specifications
88” or 96” Cutting Width (Depending on tractor mount kit)
10-Gauge Unitized Cutter Housing
5/16” Side Plates
CAT I or CAT II Three Point Hitch
4-1/2” x 5/16” Wall Cuttershaft
1-5/16” Bore Greasable, Self-Aligning Cuttershaft Bearings
60 HP Gearbox
6” Adjustable Rear Roller
1/2” to 6” Cutting Height
Available in Fine or Coarse-Cut
Torque Limiter Clutch
Front and Rear Safety Deflectors
CAT 4 Driveline
Belt Drive From Gearbox To Cuttershaft with Automatic Spring Tension

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OPERATION

2.OPERATOR REQUIREMENTS

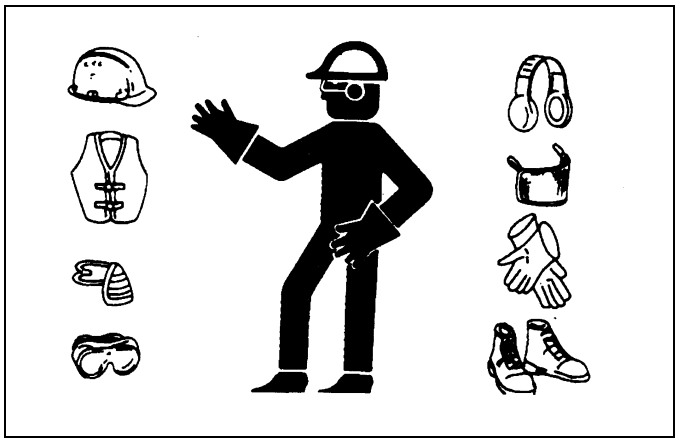
Safe operation of the unit is the responsibility of a qualified operator. A qualified operator has read and understands the implement and tractor Operator's Manuals and is experienced in implement and tractor operation and all associated safety practices. In addition to the safety messages contained in this manual, safety signs are affixed to the implement and tractor. If any part of the operation and safe use of this equipment is not completely understood, consult an authorized dealer for a complete explanation.

If the operator cannot read the manuals for themselves or does not completely understand the operation of the equipment, it is the responsibility of the supervisor to read and explain the manuals, safety practices, and operating instructions to the operator.

Safe operation of equipment requires that the operator wear approved Personal Protective Equipment (PPE) for the job conditions when attaching, operating, servicing, and repairing the equipment. PPE is designed to provide operator protection and includes the following safety wear:

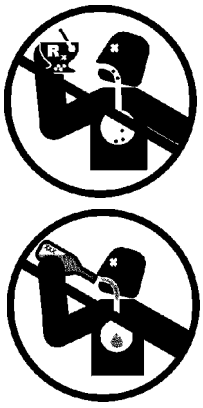
PERSONAL PROTECTIVE EQUIPMENT (PPE)

- Always Wear Safety Glasses
- Hard Hat
- Steel Toe Safety Footwear
- Gloves
- Hearing Protection
- Close Fitting Clothing
- Respirator or Filter Mask (depends on operating conditions) *OPS-U- 0002*



⚠ DANGER

DO NOT use drugs or alcohol immediately before or while operating the Tractor and Implement. Drugs and alcohol will affect an operator's alertness and coordination and therefore affect the operator's ability to operate the equipment safely. Before operating the Tractor or Implement, an operator on prescription or over-the-counter medication must consult a medical professional regarding any side effects of the medication that would hinder their ability to operate the Equipment safely. NEVER knowingly allow anyone to operate this equipment when their alertness or coordination is impaired. Serious injury or death to the operator or others could result if the operator is under the influence of drugs or alcohol. (SG-27)



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3. TRACTOR REQUIREMENTS

In addition to tractor horsepower and size required to operate the boom unit, the tractor must also be properly equipped to provide operator protection, to alert approaching vehicle drivers of the tractor's presence, and to ensure tractor stability when mowing with the boom fully extended.

Tractor Requirements and Capabilities

- ASAE approved Roll-Over Protective Structure (ROPS) or ROPS cab and seat belt.
- Tractor Safety Devices ..... Slow Moving Vehicle (SMV) emblem, lighting, PTO master shield
- Tractor Horsepower-Minimum ..... Rear INT 88" 60hp, Rear INT 96" 60hp
- Drawbar ..... 14" length-measured from end of PTO shaft to hitch pin hole, rated to carry mower tongue weight, safety chain attachment point
- Hydraulics ..... 4-Spool Valve & 2-Spool Valve with Detent Position
- Power Take Off ..... 540 RPM

3.1 ROPS and Seat Belt

The tractor must be equipped with a Roll-Over-Protective-Structure (ROPS) (tractor cab or roll-bar) and seat belt to protect the operator from falling off the tractor, especially during a roll over where the driver could be crushed and killed. Only operate the tractor with the ROPS in the raised position and seat belt fastened. Tractor models not equipped with a ROPS and seat belt should have these life saving features installed by an authorized dealer. *OPS-U- 0003*

⚠WARNING Operate this Equipment only with a Tractor equipped with an approved roll-over-protective system (ROPS). Always wear seat belts. Serious injury or even death could result from falling off the tractor--particularly during a turnover when the operator could be pinned under the ROPS. (SG-7)

3.2 Tractor Safety Devices

If transporting or operating the tractor and implement near a public roadway, the tractor must be equipped with proper warning lighting and a Slow Moving Vehicle (SMV) emblem which are clearly visible from the rear of the unit. Lights and a SMV emblem must be equipped directly on implements if the visibility of the tractor warning signals are obscured.

Maintain all manufacturer equipped safety shields and guards. Always replace shields and guards that were removed for access to connect, service, or repair the tractor or implement. Never operate the tractor PTO with the PTO master shield missing or in the raised position. *OPS-U- 0004*

3.3 Tractor Horsepower

The horsepower required to operate the mower depends on many factors including the vegetation to be cut, terrain condition, operator experience, and condition of the mower and tractor. For most mowing condition, the Rear INT 88" & 96"mowers require a tractor with at least 60HP. Operating the mower with a tractor that does not have adequate power may damage the tractor engine.

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⚠ DANGER **DO NOT** use a PTO adapter to attach a non-matching Implement driveline to a Tractor PTO. Use of an adapter can double the operating speed of the Implement resulting in excessive vibration, thrown objects, and blade and implement failure. Adapter use will also change the working length of the driveline exposing unshielded driveline areas. Serious bodily injury and/or equipment failure can result from using a PTO adapter. Consult an authorized dealer for assistance if the Implement driveline does not match the Tractor PTO. (S3PT-14)

⚠ WARNING Never operate the Tractor and Mower if the Implement input driveline is directly connected to the Tractor transmission. Tractor braking distances can be substantially increased by the momentum of the rotating Mower blades driving the Tractor transmission even though the Tractor clutch has been disengaged. Install an over running clutch between the Tractor PTO and the Mower driveline to prevent this potentially dangerous situation. (S3PT-16)

4. GETTING ON AND OFF THE TRACTOR

Before getting onto the tractor, the operator must read and completely understand the implement and tractor operator manuals. If any part of either manual is not completely understood, consult an authorized dealer for a complete explanation. *OPS-U- 0007*

⚠ WARNING Do not mount or dismount the Tractor while the tractor is moving. Mount the Tractor only when the Tractor and all moving parts are completelystopped. (SG-12)

4.1 Boarding the Tractor

Use both hands and equipped handrails and steps for support when boarding the tractor. Never use control levers for support when mounting the tractor. Seat yourself in the operator's seat and secure the seat belt around you.

Never allow passengers to ride on the tractor or attached equipment. Riders can easily fall off and be seriously injured or killed from falling off and being ran over. It is the operator's responsibility to forbid all extra riders at all times. *OPS-U- 0008*

⚠ DANGER Never allow children to operate, ride on, or come close to the Tractor or Implement. Usually, 16-17 year-old children who are mature and responsible can operate the implement with adult supervision, if they have read and understand the Operator's Manuals, been trained in proper operation of the tractor and Implement, and are physically large enough to reach and operate the controls easily. (SG-11)

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⚠ DANGER Never allow children or other persons to ride on the Tractor or Implement. Falling off can result in serious injury or death. (SG-10)

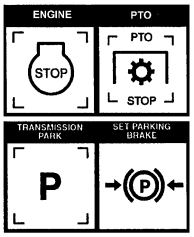
⚠ WARNING Do not mount or dismount the Tractor while the tractor is moving. Mount the Tractor only when the Tractor and all moving parts are completelystopped. (SG-12)

4.2 Dismounting the Tractor

Before dismounting the tractor, idle the tractor engine down, disengage the head and retract the boom arm to the transport position. Park the tractor on a level surface, place the transmission in neutral and set the parking brake. Shut down the tractor engine, remove the key, and wait for all motion to come to a complete stop before exiting the operator's seat. NEVER leave the seat until the tractor, its engine, and mower head movement have come to a complete stop.

Use hand rails and extra steps when exiting the tractor. Be careful of your step and use extra caution when mud, ice, snow, and other matter has accumulated on the steps and handrails. Never rush or jump off the tractor. *OPS-B- 0002*

⚠ DANGER BEFORE leaving the tractor seat lower the implement, set the parking brake and/or set the tractor transmission in parking gear, disengage the PTO, stop the engine, remove the key, and wait for all moving parts to stop. Place the tractor shift lever into a low range or parking gear to prevent the tractor from rolling. Never dismount a Tractor that is moving or while the engine is running. Operate the Tractor controls from the tractor seat only. (SG-9)



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5. STARTING THE TRACTOR

The operator must have a complete understanding of the placement, function, and operational use of all tractor controls before starting the tractor. Review the tractor operator's manual and consult an authorized dealer for tractor operation instructions if needed.

Essential Tractor Controls:

- Locate the ignition key/switch
- Locate the engine shut off control
- Locate the hydraulic control levers
- Locate the light control lever
- Locate the brake pedals and clutch
- Locate the PTO control
- Locate the 3 point hitch control lever
- Locate the boom operating controls (joystick or valve bank)

Before starting the tractor ensure the following:

- Conduct all pre-start operation inspection and service according to the tractor operator's manual.
- Make sure all guards, shields, and other safety devices are securely in place.
- The parking brake is on.
- The tractor transmission levers are in park or neutral.
- The boom operating controls are in the neutral and off position.
- The PTO control lever is disengaged.
- The hydraulic remote control levers are in the neutral position.

Refer to the tractor owner's manual for tractor starting procedures. Only start the tractor while seated and belted in the tractor operator's seat. Never bypass the ignition switch by short circuiting the starter solenoid. After the tractor engine is running, avoid accidental contact with the tractor transmission to prevent sudden and unexpected tractor movement. *OPS-B- 0003*

⚠ DANGER Never run the Tractor engine in a closed building or without adequate ventilation. The exhaust fumes can be hazardous to your health. (SG-23)

⚠ DANGER Start tractor only when properly seated in the Tractor seat. Starting a tractor in gear can result in injury or death. Read the Tractor operators manual for proper starting instructions. (SG-13)

6. CONNECTING THE MOWER TO THE TRACTOR

Use extreme caution when connecting the mower to the tractor. The mower should be securely resting at ground level or setting on blocks. Keep hands and feet from under the mower deck and clear of pinch points between the tractor hitch arms and mower pins. *OPS-R-0001*

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⚠ DANGER Always shut the Tractor completely down, place the transmission in park, and set the parking brake before you or anyone else attempts to connect or disconnect the Implement and Tractor hitches. (S3PT-15)

6.1 Connecting the Mower A-Frame to the Tractor

1. Make sure the tractor is equipped with the correct PTO shaft. Change shafts if needed.
2. Shorten or remove the tractor drawbar to avoid interference when raising and lowering the mower.
3. Board the tractor and start the engine. Position the tractor to the mower with the 3-point lift arms positioned between the respective set of mower A-frame lift lugs. Note: Set the 3-point lift control to “Position Control” so that the lift arms maintain a constant height when attaching the mower. See the tractor Operator’s Manual for correct settings when attaching 3-point equipment.
4. Turn off the tractor engine and dismount.
5. One lift arm at a time, align arm end hole between the set of A-frame lift lugs. Insert hitch pin through the lug and arm holes and insert retaining pin into hitch pin.
6. Walk around to opposite side and repeat procedure for remaining lift arm and hitch pin.
7. Extend or retract 3-point top link to align its end hole with the holes of the mower’s top link. Insert the top link hitch pin and insert retaining pin into hitch pin.
8. Adjust any lower link check chains, guide blocks, or sway blocks to prevent the mower from swaying side to side and possible contact with tractor rear tires.

6.2 Safety Tow Chain

If the mower is towed on a public roadway, a safety chain with tensile strength equal to or greater than the gross weight of the mower must be connected between the tractor and mower. This will help control the implement in the event the tongue becomes disconnected from the drawbar. Make sure the chain is attached to a secure location on the tractor and not to an intermediate support.

After connecting both ends of the safety chain, drive the tractor to the right and left to check for proper chain length. Adjust length as necessary and allow only enough slack in the chain to make a maximum turn in both directions. When not in use, store the safety chain to protect it from mud or standing water by wrapping the chain around the tongue. Replace the safety chain if one or more links or end fittings are broken, stretched or otherwise damaged or deformed. *OPS-U-0039*

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OPERATION

7. SETTING THE MOWER

Properly setting the cutting height is essential for efficient and safe operation. A properly set mower will make a more uniform cut, distribute clippings more evenly, require minimal tractor work, and follow the contour of uneven terrain. ***NOTE:*** *Avoid very low cutting heights, striking the ground with the blades gives the most damaging shock loads and will cause damage to the mower and drive. Blades contacting the ground may cause objects to be thrown out from under the mower deck. Always avoid operating the mower at a height which causes the blades to contact the ground. OPS-U- 0010*

⚠ DANGER Never work under the Implement, the framework, or any lifted component unless the Implement is securely supported or blocked up to prevent sudden or inadvertent falling which could cause serious injury or even death. (SG-14)

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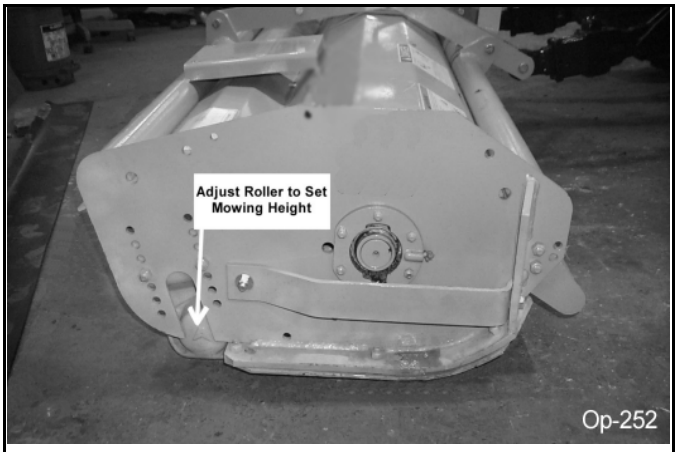
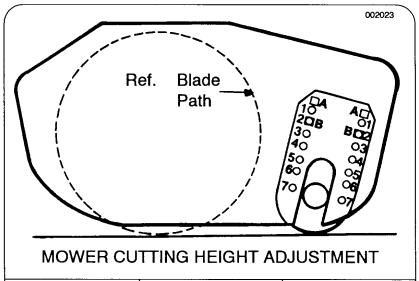
7.1 Roller Height Adjustment

1. The mower's cutting height is set by positioning the roller assembly for each mower section. Each section must be set at the same height to ensure an even cut across the entire width of the mower.
2. Place the tractor and mower on a level surface and completely lower the mower to the ground.
3. Shut down the tractor, place the transmission in park, and set the parking brake before dismounting.
4. One section at a time, place lifting device (scissors jack or hydraulic jack) under center of cutter housing.
5. Remove hex nuts, washers and carriage bolts from bracket at each end of roller. Make certain that roller bracket is free to move once the fasteners are removed. A stuck roller could drop unexpectedly and cause injury.
6. Use lifting device to reposition cutter housing to desired cutting height. Align bracket holes with cutter housing, then reinstall hardware.
7. Lower cutter housing to the ground and remove lifting device.
8. Set cutting height according to procedures above for remaining two cutter sections. Make sure that all three rollers are set at the same height to ensure a even cut across the entire width of the mower.





MOWER CUTTING HEIGHT ADJUSTMENT

DESIRED CUTTING HEIGHT (INCHES)	ADJUSTMENT BRACKET HOLE	MOWER END PLATE HOLE
1/2	B	2
1	A	1
1-1/2	B	3
2	A	2
2-1/2	B	4
3	A	3
3-1/2	B	5
4	A	4
4-1/2	B	6
5	A	5
5-1/2	B	7
6	A	6

Op- 253

Hydraulic Cylinder Priming

Hydraulic Cylinders must be filled with hydraulic oil before releasing the wing transport locks to lower the mower. Hydraulic cylinders and lines are filled by holding the valve control levers in the raised position until the cylinders fully extend then place the control lever in the float position. Repeat the process several more times to ensure wings are entirely supported by the hydraulic cylinders before releasing the transport locks and lowering the mower.

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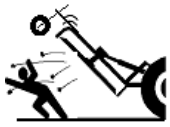
7.2 Leveling Deck

To Facilitate a safe and efficient mowing operation, the mower should be operated parallel to the ground at all times. Never operate if front or rear of mower is tilted upward. Objects may be discharged at high speeds causing possible injury or even death.

Adjust Top Link to level mower roller adjustment. Side Skid Shoes should always be parallel to ground throughout the full adjustment range. Adjust cutting height of machine by raising or lowering rear roller as specified in Operation Section.

⚠WARNING Do not let the Blades turn when the Mower Deck is raised for any reason, including clearance or for turning. Raising the Mower deck exposes the Cutting Blades which creates a potentially serious hazard and could cause serious injury or even death from objects thrown from the Blades. (SRM-07)



8. DRIVELINE ATTACHMENT

The driveline yoke and tractor PTO shaft must be dirt free and greased for attachment.

To connect the mower driveline to the tractor PTO output shaft, pull the driveline yoke collar back and align the grooves and splines of the yoke with those of the PTO shaft. Push the driveline yoke onto the PTO shaft, release the locking collar, and position the yoke until the locking collar balls are seated onto the PTO shaft. Push and pull the driveline back and forth several times to ensure a secure attachment.

After the driveline is securely attached, place the tractor PTO master shield back in the operating position. *OPS-R-0003*

8.1 Driveline Length Check

⚠WARNING Before operating the Implement, check to make sure the Implement input driveline will not bottom out or become disengaged. Bottoming out occurs when the inner shaft penetrates the outer housing until the assembly becomes solid-it can shorten no more. Bottoming out can cause serious damage to the Tractor PTO by pushing the PTO into the Tractor and through the support bearings or downward onto the PTO shaft, breaking it off. A broken driveline can cause personal injury. (S3PT-18)

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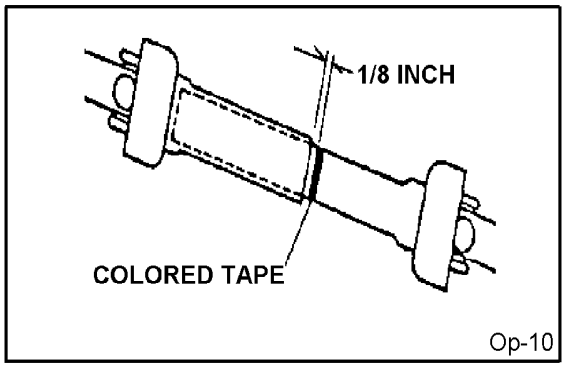
When fitting the mower to the tractor, the telescoping driveline must be inspected to ensure that at its most compressed position, the profiles do not “bottom out”, and when at its farthest extended position, there is sufficient engagement between the profiles to operate safely. At its shortest length, there must be at least a 1” clearance between each profile end and opposite profile universal joint. At its farthest operating extension, a minimum profile engagement of 12” must be maintained.

“Bottoming Out” Check Procedure

- Disconnect driveline from the tractor and slide the profiles together until fully compressed.
- Place a mark on the inner shield 1/8” from the end of the outer shield and reattach the driveline to the PTO Shaft.
- With the ***PTO NOT TURNING***, slowly drive the tractor with mower attached through the sharpest turn possible and watch shaft movement. With the ***PTO NOT TURNING***, slowly drive the tractor with the mower attached through the most severe terrain conditions expected and watch shaft movement.
- If the distance between the mark and the outer shield becomes less than 2” at any point there is a potential problem bottoming out the driveline and the driveline should be shortened. *OPS-F-0001*



Driveline in maximum compressed position

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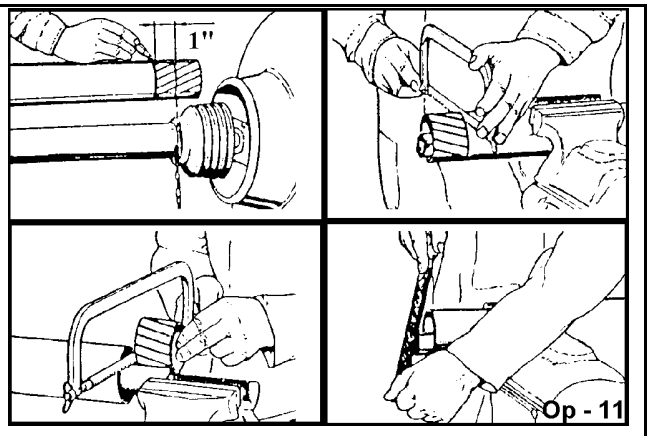
OPERATION

Shorten the driveline profiles as follows:

- Remove the driveline from the tractor.
- Position the mower to the point with the shortest distance between the tractor PTO shaft and cutter gearbox. Shut down the tractor and securely block the mower in this position.
- Pull driveline apart and reattach yoke to PTO shaft.
- Hold driveline sections parallel to one another and measure back 1" from yoke of each shaft and place mark on opposite section. Cut this length off with a saw.
- Round off all sharp edges and debur.
- Thoroughly grease then reinstall the driveline.
- Recheck for proper operation.



Engagement Check Procedure

- With the driveline attached, position the mower to the point where the telescoping driveline is at its maximum extension. Completely shut down the tractor and secure in position.
- Mark the inner driveline shield 1/8" from the end of the outer shield.
- Disconnect the driveline from the tractor and separate the two driveline halves.
- Measure the distance from the mark to the end of the inner profile. This length is the amount the driveline profiles were engaged.
- If the engaged length is less than 12" the shaft is considered too short and should be replaced with a longer shaft. Consult an authorized dealer to purchase the required driveline length.

NOTE: *If the driveline cannot be shortened and still maintain the required profile engagement, the operator must be made aware of terrain conditions and avoid situations which pose a potential problem to avoid damaging the driveline. OPS-F-0002*

9. PRE-OPERATION INSPECTION AND SERVICE

Before each use, a pre-operation inspection and service of the implement and tractor must be performed. This includes routine maintenance and scheduled lubrication, inspecting that all safety devices are equipped and functional, and performing needed repairs. DO NOT operate the unit if the pre-operation inspection reveals any condition affecting safe operation. Perform repairs and replacement of damaged and missing parts as soon as noticed. By performing a thorough pre-operation inspection and service, valuable down time and repair cost can be avoided. *OPS-U-0029*

⚠ DANGER Always disconnect the main PTO Driveline from the Tractor before performing service on the Mower. Never work on the Mower with the tractor PTO driveline connected and running. Blades or Drivelines could turn without warning and cause immediate entanglement, injury or death. (SRM-3)

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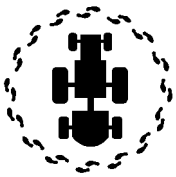
⚠ DANGER **DO NOT** allow any person under a folded wing unless wing is securely locked up or supported. **DO NOT** approach the Implement unless the Tractor is turned off and all motion has ceased. Never work under the frame work, or any lifted component unless the implement is securely supported or blocked up. A sudden or inadvertent fall by any of these components could cause serious injury or even death. (STI-03)

⚠ WARNING Periodically inspect all moving parts for wear and replace when necessary with authorized service parts. Look for loose fasteners, worn or broken parts, and leaky or loose fittings. Make sure all pins have cotter pins and washers. Serious injury may occur from not maintaining this machine in good working order. (SG-21)



9.1 Tractor Pre-Operation Inspection/Service

Refer to the tractor operator's manual to ensure a complete pre-operation inspection and scheduled service is performed according to the manufacturers recommendations. The following are some of the items that require daily service and inspection:

- Tire condition/air pressure
- Wheel lug bolts
- Steering linkage
- PTO shield
- SMV sign is clean and visible
- Tractor's lights are clean and functional
- Tractor Seat belt is in good condition
- Tractor ROPS is in good condition
- ROPS is in the raised position
- No tractor oil leaks
- Radiator free of debris
- Engine oil level and condition
- Engine coolant level and condition
- Power brake fluid level
- Power steering fluid level
- Fuel condition and level
- Sufficient lubrication at all lube points
- Air filter condition *OPS-U-0030*

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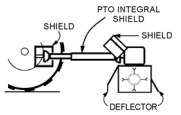
9.2 Mower Pre-Operation Inspection/Service

Before each mower use, a complete inspection and service is required to ensure the mower is in a good and safe working condition. Damaged and/or broken parts should be repaired and/or replaced immediately. To ensure the mower is ready for operation, conduct the following. *OPS-R-0007*

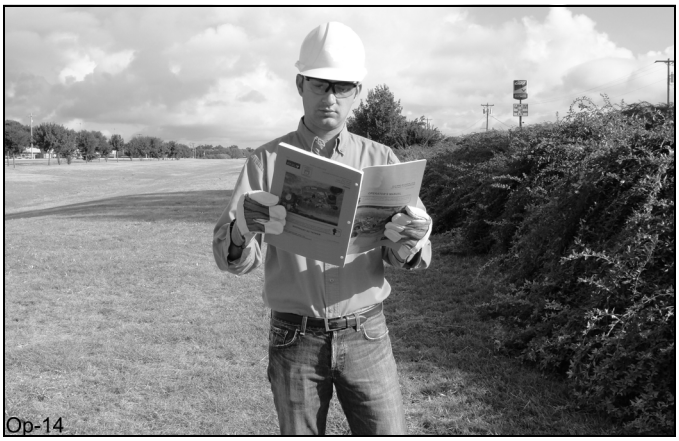
⚠ DANGER All Safety Shields, Guards and Safety devices including (but not limited to) - the Deflectors, Steel Guards, Gearbox Shields, PTO integral shields , and Retractable Door Shields should be used and maintained in good working condition. All safety devices should be inspected carefully at least daily for missing or broken components. Missing, broken, or worn items must be replaced at once to reduce the possibility of injury or death from thrown objects, entanglement, or blade contact. (SFL-5)

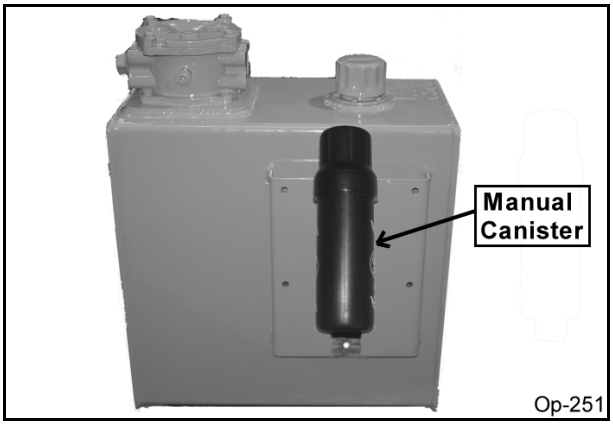


⚠ DANGER Replace bent or broken blades with new blades. NEVER ATTEMPT TO STRAIGHTEN, WELD, OR WELD HARDFACING ON BLADES SINCE THIS WILL LIKELY CRACK OR OTHERWISE DAMAGE THE BLADE WITH SUBSEQUENT FAILURE AND POSSIBLY CAUSE SERIOUS INJURY FROM THROWN BLADES. (SGM-10)

The operator's manual and safety signs affixed on the unit contain important instructions on the safe and proper use of the equipment. Maintain these important safety features on the implement in good condition to ensure the information is available to the operator at all times.

- Ensure the manual canister is secured to the equipment with the operator's manual inside.
- Ensure all safety signs are in place and legible. Replace missing, damaged, and illegible decals. *OPS-U- 0011*


Op-14



Op-251

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- Check that the main driveline securely attached to the tractor and the locking collar is seated in the groove of the PTO Shaft.
- Ensure wing hydraulics are secure at both ends.
- Ensure the mower hitch is securely attached to the tractor drawbar with a proper size bolt and secured nut.
- Ensure that a properly rated safety tow chain is equipped securing the mower to the tractor. *OPS-F- 0003*

Op-254

- Ensure rubber deflectors are in position and not damaged. Replace worn, broken, and missing sections immediately.
- Ensure the rollers are in good condition and rotate freely.
- Ensure the driveline integral shield is in good condition and rotate freely.
- Inspect that all bolts and screws are in position and are properly torqued. *OPS-F- 0004*

Op-255

- Inspect the condition of the wings and rear section drive belts.
- Ensure the slip clutch (rear mower section only) is properly adjusted and the friction plates are not frozen together. Reference the Maintenance Section for proper slip clutch maintenance.
- Ensure the slip clutch shield and drive belts shields are in place and in good repair.
- Ensure the tractor PTO master shield is in place, lowered and in good condition. *OPS-F- 0005*

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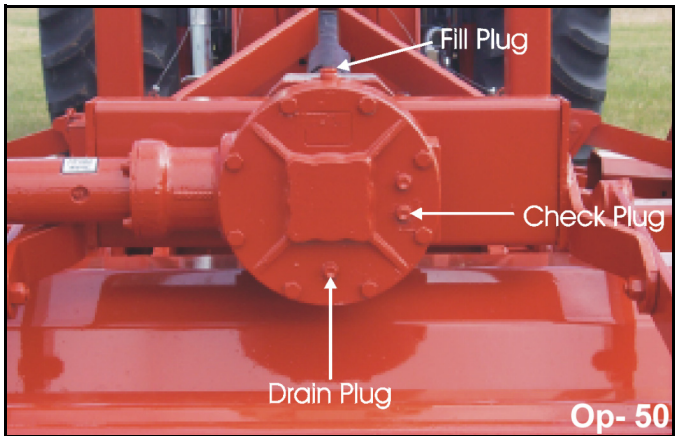
- Inspect oil level in gearbox and replenish if needed. A low oil level is a warning sign that the gearbox may be cracked or its seal is damaged and needs to be replaced.
- Check the oil level in tank and replenish if need. ***NOTE:*** Do not fill the tank with oil above the level of the sight gauge. Over filling the tank with oil after initial filling may result in oil being discharged through the air filter on the top of the hydraulic tank.
- Perform scheduled lubrication as specified in the maintenance section. *OPS-F- 0006*



- Inspect cutter knives and knife pins for looseness and excessive wear. Make sure the mower is securely blocked up before crawling beneath. Replace damaged, worn, and missing knives as complete sets to maintain cuttershaft balance.
- Remove any grass or other debris which may be wrapped around the cuttershafts.
- Inspect the condition of deck skid shoes and hardware. *OPS-F- 0007*

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Flail Mower PRE-OPERATION Inspection

Mower ID#_____ Make _____

Date: _____ Shift _____

WARNING **Before conducting the inspection, make sure the tractor engine is off, all rotation has stopped and the tractor is in park with the parking brake engaged. Make sure the mower is resting on the ground or securely blocked up and all hydraulic pressure has been relieved.**

Item	Condition at Start of Shift	Specific Comments if not O.K.
FLAIL MOWER The Operator's Manual is in the canister on the mower		
All safety decals are in place and legible		
The hitch connection bolts & pins are tight		
There are no cracks in hitch		
Their mower deck is clear of cut grass and debris		
The thrown object guard/deflectors are in place		
Their guards/deflectors are in good condition		
The driveline/gearbox shields are in good condition		
The driveline clutch is in good condition, not frozen		
The driveline tubes & u-joints have been lubricated		
The driveline yoke is securely attached to the PTO		
The gearbox oil level is full		
Blades are not broken, chipped, cracked or bent		
Blade shackles are in good condition with no cracks		
The blade pins are properly retained		
The skid shoes are in good condition & tight		
The rear roller is in good condition and turns freely		

Operator's Signature:

_____

DO NOT OPERATE an UNSAFE TRACTOR or MOWER

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OPERATION

Tractor PRE-OPERATION Inspection

Mower ID#_____ Make _____

Date: _____ Shift _____

WARNING **Before conducting the inspection, make sure the tractor engine is off, all rotation has stopped and the tractor is in park with the parking brake engaged. Make sure the mower is resting on the ground or securely blocked up and all hydraulic pressure has been relieved.**

Item	Condition at Start of Shift	Specific Comments if not O.K.
The flashing lights function properly		
The SMV Sign is clean and visible		
The tires are in good condition with proper pressure		
The wheel lug bolts are tight		
The tractor brakes are in good condition		
The steering linkage is in good condition		
There are no visible oil leaks		
The hydraulic controls function properly		
The ROPS or ROBS Cab is in good condition		
The seatbelt is in place and in good condition		
The 3-point hitch is in good condition		
The drawbar pins are securely in place		
The PTO master shield is in place		
The engine oil level is full		
The brake fluid level is full		
The power steering fluid level is full		
The fuel level is adequate		
The engine coolant fluid level is full		
The radiator is free of debris		
The air filter is in good condition		

Operator's Signature:_____

DO NOT OPERATE an UNSAFE TRACTOR or MOWER

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10. DRIVING THE TRACTOR AND IMPLEMENT

Safe tractor transport requires the operator possess a thorough knowledge of the model being operated and precautions to take while driving with an attached implement. Ensure the tractor has the capacity to handle the weight of the implement and the tractor operating controls are set for safe transport. To ensure safety while driving the tractor with an attached implement, review the following. *OPS-U- 0012*

⚠ DANGER This Implement may be wider than the Tractor. Be careful when operating or transporting this equipment to prevent the Implement from running into or striking sign posts, guard rails, concrete abutments or other solid objects. Such an impact could cause the Implement and Tractor to pivot violently resulting in loss of steering control, serious injury, or even death. Never allow the Implement to contact obstacles. (S3PT-12)

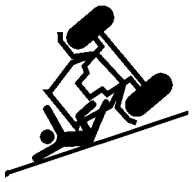
⚠ WARNING Transport only at speeds where you can maintain control of the equipment. Serious accidents and injuries can result from operating this equipment at high speeds. Understand the Tractor and Implement and how it handles before transporting on streets and highways. Make sure the Tractor steering and brakes are in good condition and operate properly.

Before transporting the Tractor and Implement, determine the proper transport speeds for you and the equipment. Make sure you abide by the following rules:

Test the tractor at a slow speed and increase the speed slowly. Apply the Brakes smoothly to determine the stopping characteristics of the Tractor and Implement. As you increase the speed of the Tractor the stopping distance increases. Determine the maximum transport speed not to exceed 20 mph (30 kph) for transporting this equipment.

Test the equipment at a slow speed in turns. Increase the speed through the turn only after you determine that the equipment can be operated at a higher speed. Use extreme care and reduce your speed when turning sharply to prevent the tractor and implement from turning over. Determine the maximum turning speed for you and this equipment before operating on roads or uneven ground.

Only transport the Tractor and Implement at the speeds which allow you to properly control the equipment.



Be aware of the operating conditions. Do not operate the Tractor with weak or faulty brakes or worn tires. When operating down a hill or on wet or rain slick roads, the braking distance increases: use extreme care and reduce your speed. When operating in traffic always use the Tractor's flashing warning lights and reduce your speed. Be aware of traffic around you and watch out for the other guy. (SG-19)

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10.1 Starting the Tractor

The procedure to start the tractor is model specific. Refer to the tractor operator's manual for starting procedures for your particular tractor. Consult an authorized dealer if the starting procedure is unclear. Ensure the 3-point control lever is in the lowered position and the PTO is disengaged before starting the tractor. *OPS-U-0033*

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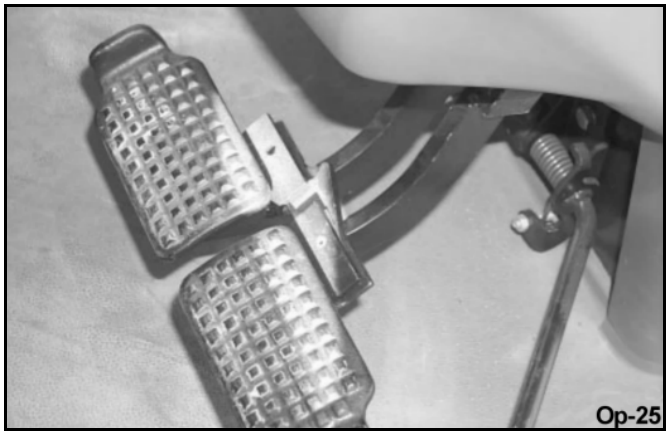
10.2 Brake and Differential Lock Setting

Make sure the tractor brakes are in good operating condition. Tractor brakes can be set to operate independently allowing single rear wheel braking action or locked together to provide simultaneous rear wheel braking. FOR MOST DRIVING AND OPERATING CONDITIONS, THE BRAKE PEDALS SHOULD BE LOCKED TOGETHER TO PROVIDE THE MOST EFFECTIVE BRAKING ACTION.

Always disengage the tractor differential lock when turning. When engaged the differential lock will prevent or limit the tractor from turning. During normal cutting conditions, locking the differential provides no benefit and should not be used. *OPS-U- 0013*


Op-25

⚠WARNING Be aware of the operating conditions. Do not operate the Tractor with weak or faulty brakes. When operating down a hill or on wet or rain slick roads, the braking distance increases; use extreme care and reduce your speed in these conditions. When operating in traffic, always use the Tractor's flashing warning lights and reduce your speed. Be aware of traffic around you and watch out for the other guy.

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11. Operating the Mower Wings

Raising to Transport Position

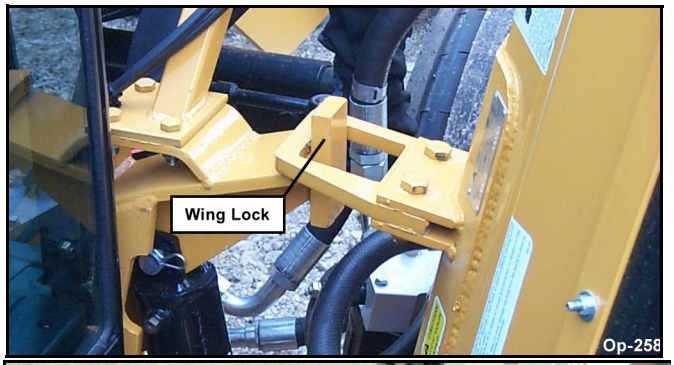
1. With tractor engine running, place ON/OFF switch(s) in "OFF" position and wait for cuttershaft(s) to stop rotating.

2. Pull LIFT control lever rearward until lift frame is as high as it will go.

3. Pull TILT control lever rearward until bracket on unit is above support bar on lift cylinder support. If unit is in the detent “FLOAT”, it will takes some effort to pull TILT lever from "FLOAT" position.

4. Push LIFT control lever forward enough to lower unit slowly. Bar on cylinder support must pass through bracket on unit as shown in **Figure 268.**

5. Make certain that all control levers are in "HOLD" position when transporting unit.



LEFT SIDE		RIGHT SIDE	
TILT CYL	LIFT CYL	LIFT CYL	TILT CYL
FLOAT	FLOAT	FLOAT	FLOAT
▲	&	&	▲
OUT	DOWN	DOWN	OUT
▲	▲	▲	▲
HOLD	HOLD	HOLD	HOLD
▼	▼	▼	▼
IN	UP	UP	IN

NOTE: *Lift and Tilt cylinder rods may be adjusted to provide proper transport bracket to support bar clearance.*

Loosen rod end clamp.

Shorten stroke on LIFT cylinder to raise lift frame. Lengthen stroke on LIFT cylinder to lower lift frame.

and/or

Shorten stroke on TILT cylinder to move transport bracket closer to support bar. Lengthen stroke on TILT cylinder to move transport bracket away from support bar.

Once sufficient clearance is obtained, tighten rod end clamp.

The mower’s center of gravity is raised making the mower more prone to tipping when the wings are in the raised position. Use extreme caution when towing the mower in the transport position and avoid uneven terrain which could upset the mower.

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⚠ DANGER When the Wings are folded for transport, the center of gravity is raised and the possibility of overturn is increased. Drive slowly and use extreme caution when turning on hillsides. Overturning the Implement could cause the Implement to overturn the Tractor and vice versa resulting in serious injury or even death. Never fold wings on a hillside...the Implement or unit may overturn. (STI-02)

Lowering into Operating Position

Ensure that ON/OFF switch(es) is (are) in "OFF" position. With tractor engine running, pull LIFT control lever rearward until bracket on cutter unit clears support bar on lift cylinder support. Push TILT control lever forward until cutter unit is level with ground. Push LIFT lever forward enough to slowly lower unit until it touches ground, then push both levers forward to "FLOAT" position.

⚠ DANGER The mower head will start running when lowered if the mower ON/OFF switch is in the ON position. Make sure the SWITCH is in the OFF positon before lowering mower wing(s). (SFL-10)

NOTE: For best mowing results and longer roller life, both LIFT and TILT levers should be in "FLOAT" position while mowing.

It takes some effort to pull TILT lever from "FLOAT" position because of detent spring.

The mower must be operated with the cutter sections fully lowered and the hydraulic control lever in the float detent to ensure the mower follows the contour of the ground and to prevent sections from creeping up. NEVER attempt to raise the mower while the mower is operating.

LEFT SIDE		RIGHT SIDE	
TILT CYL	LIFT CYL	LIFT CYL	TILT CYL
FLOAT	FLOAT	FLOAT	FLOAT
▲	&	&	▲
OUT	DOWN	DOWN	OUT
▲	▲	▲	▲
HOLD	HOLD	HOLD	HOLD
▼	▼	▼	▼
IN	UP	UP	IN

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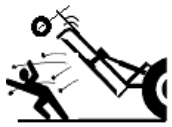
11.1 Engaging and Disengaging the Power Take Off (PTO) and Wings

Before engaging the PTO, make certain that the area is clear of bystanders and passersby. The implement must be lowered to the mowing position. NEVER engage the PTO with the implement in the raised position. Set the tractor engine speed at approximately 1,000 RPM before engaging the PTO. Shift the PTO control to the on position.

To start the wings, make sure they are in the lowered position (refer to Lowering Wings into Operating Position of the operation section) and PULL the start/stop button(s) to start the wing motor(s) and slowly increase the engine speed until the PTO is operating at the rated speed. If you hear unusual noises or see or feel abnormal vibrations, lower the engine RPM's, disengage the PTO and PUSH the wing start/stop button(s) to stop the wing motor(s). Inspect the implement to determine the cause of the noise or vibration and repair the abnormality.

⚠WARNING Do not let the Blades turn when the Mower Deck is raised for any reason, including clearance or for turning. Raising the Mower deck exposes the Cutting Blades which creates a potentially serious hazard and could cause serious injury or even death from objects thrown from the Blades. (SRM-07)



⚠WARNING Do not put hands or feet under mower decks. Blade Contact can result in serious injury or even death. Stay away until all motion has stopped and the decks are securely blocked up. (SGM-09)

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11.2 Driving the Tractor and Implements

Start off driving at a slow speed and gradually increase your speed while maintaining complete control of the tractor and units. Moving slowly at first will also prevent the tractor from rearing up and loss of steering control. The tractor should never be operated at speeds that cannot be safely handled or which will prevent the operator from stopping quickly during an emergency. If the power steering or engine ceases operating, stop the tractor immediately as the tractor will be difficult to control.

Drive the tractor with the 3-Point lift arms in the raised position and lock the control lever in the transport detent position to prevent damage to the mower driveline and tongue when turning.

Perform turns with the tractor and units at slow speeds to determine how the tractor with an attached blade or rake handles a turn. Determine the safe speed to maintain proper control of the tractor when making turns. When turning with a towed implement, the overall working length of the unit is increased. Allow additional clearance for the units when turning.

To avoid overturns, drive the tractor with care and at safe speeds, especially when operating over rough ground, crossing ditches or slopes, and turning corners. Tractor wheel tread spacing should be increased when working on inclines or rough ground to reduce the possibility of tipping.

Use extreme caution when operating on steep slopes. Keep the tractor in a low gear when going downhill. DO NOT coast or free-wheel downhill. *OPS-F- 0009*

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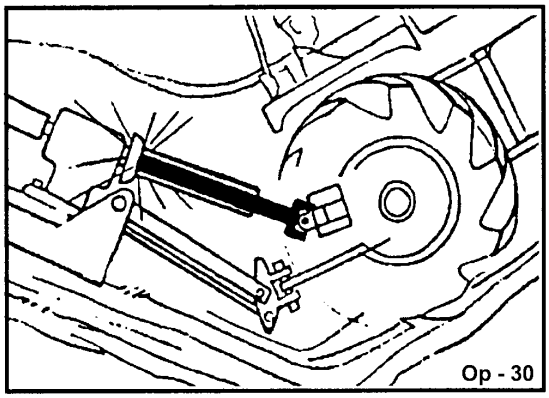
11.3 Crossing Ditches and Steep Inclines

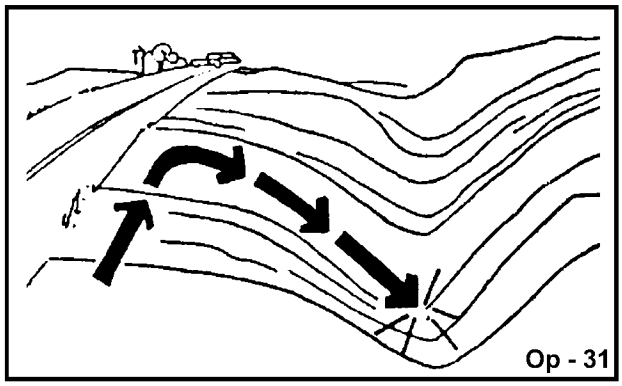
When crossing ditches with steep banks or going up sharp inclines, it is possible that the main driveline inner profile will penetrate into the outer housing to its maximum depth until the assembly becomes solid (driveline is at its extreme shortest length). This type of abusive operation can cause serious damage to the tractor and mower drive by pushing the PTO into the tractor and through the support bearings or downward onto the PTO shaft, breaking it off.



⚠WARNING Damage resulting from over-collapse of the driveline's inner profile and its outer housing may allow the driveline to come loose from the Tractor which could cause bodily injury to the operator or bystanders and/or extensive damage to the Tractor or Implement. *OPS-R-0020*

When confronted with an incline or ditch, do not approach from an angle which is perpendicular or straight on as damaged to over collapse of the driveline may occur.

When crossing such terrain, the implement should be fully lowered for a lower center of gravity and added stability. *OPS-R-0021*



INCORRECT: DO NOT approach ditch straight on

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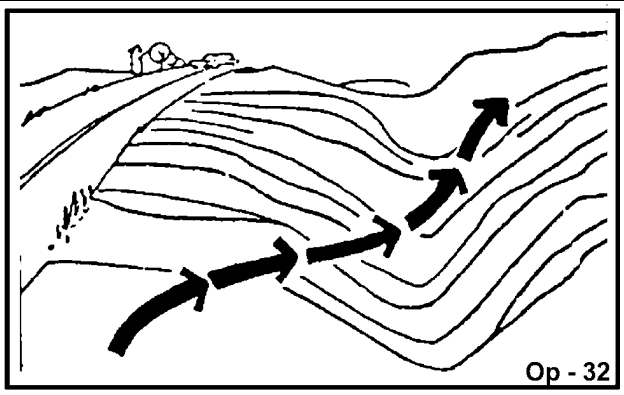
Inclines and ditches should be approached along a line which is at an angle as shown. This type of path will reduce the possibility of over-collapse of the driveline and resulting damage. If the gradient is so steep that such an approach increases the possibility of a tractor roll-over, select an alternate crossing path.

When operating the tractor and mower across slopes and inclines, through ditches, and other uneven terrain conditions, it is important to maintain sufficient deck to ground clearance. Blade contact with the ground may cause soil, rocks and other debris to be thrown out from under the mower resulting in possible injury and/or property damage. Ground contact also produces a severe shock load on the mower drive and to the mower blades resulting in possible damage and premature wear. *OPS-R-0022*



CORRECT: Approach ditch at an angle

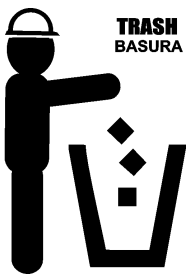
12. OPERATING THE TRACTOR AND IMPLEMENT

THE OPERATOR MUST COMPLETELY UNDERSTAND HOW TO OPERATE THE TRACTOR AND IMPLEMENT AND ALL CONTROLS BEFORE ATTEMPTING TO OPERATE. The operator must read and understand the Safety and Operation Sections of the implement and tractor operator's manuals. These manuals must be read and explained to any operator who cannot read. Never allow someone to operate the implement and tractor without complete operating instructions.

Before starting any operation, the operator must become familiar with the area to be worked in and any obstacles and hazards contained within to ensure safety to the operator, bystanders, and equipment. Special attention should be paid to foreign debris, rough terrain, steep slopes, and passersby and animals in the area. *OPS-U- 0015*

⚠WARNING

Extreme care should be taken when operating near loose objects such as gravel, rocks, wire, and other debris. Inspect the area before mowing. Foreign objects should be removed from the site to prevent machine damage and/or bodily injury or even death. Any objects that cannot be removed must be clearly marked and carefully avoided by the operator. Stop mowing immediately if blades strike a foreign object. Repair all damage and make certain rotor or blade carrier is balanced before resuming mowing. (SGM-05)



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⚠WARNING Many varied objects, such as wire, cable, rope, or chains, can become entangled in the operating parts of the mower head. These items could then swing outside the housing at greater velocities than the blades. Such a situation is extremely hazardous and could result in serious injury or even death. Inspect the cutting area for such objects before mowing. Remove any like object from the site. Never allow the cutting blades to contact such items. (SGM-06)

12.1 Foreign Debris Hazards

Before mowing, inspect the area to make sure there are no foreign objects that the mower blades could hit or become entangled with. Remove all foreign objects and debris. If objects are too big to remove, mark them clearly and be sure to prevent the mower blades from contacting them.

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If you hit a solid object or foreign debris, stop the mower and tractor at once. Immediately idle the engine speed and disengage the PTO. Wait for all mower rotating motion to stop, then raise the mower and move the tractor and implement off the object. Inspect the area and remove, or mark the location of the debris. Inspect the condition of the mower and make any needed repairs immediately. Make sure the blades are not damaged and the carrier is balanced before resuming operation.

Always wear your seat belt securely fastened and only operate the tractor and mower with the ROPS in the raised position. If the tractor or mower hits a tree stump, rock, or bump, a sudden movement could throw you off of the seat and under the tractor and/or mower. The seat belt is your best protection from falling off the tractor and the ROPS provides protection from being crushed during a tractor roll-over. *OPS-F-0010*

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12.2 Bystanders/Passersby Precautions

If a bystander comes within 300 feet of the tractor while the mower is being operated, stop the tractor at once, idle the engine and disengage the PTO. Do not engage the PTO again until all bystanders are well past the 300 foot distance. *OPS-R-0024*

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⚠ DANGER Flail Mowers are capable under adverse conditions of throwing objects for great distances (300 feet or more) and causing serious injury or death. Follow safety messages carefully.

STOP MOWING IF PASSERSBY ARE WITHIN 300 FEET UNLESS:

-Front and Rear Deflectors, Chain Guards, or Bands are installed and in good, workable condition;

-Mower sections or Wings are running close to and parallel to the ground without exposed Blades;

-All areas have been thoroughly inspected and all foreign material such as rocks, cans, glass, and general debris has been removed.

NOTE: *Where there are grass and weeds high enough to hide debris that could be struck by the blades, the area should be: inspected and large debris removed, mowed at an intermediate height, inspected closely with any remaining debris being removed, and mowed again at desired final height. (This will also reduce power required to mow, reduce wear and tear on the Mower drivetrain, spread cut material better, eliminate streaking, and make the final cut more uniform.)* (SFL-6)

12.3 PTO RPM and Ground Speed

Ground speed for mowing will depend upon the height, type, and density of vegetation to be cut. Recommended speed for efficient mower performance is between 2 and 5 mph(3-8 kph). Operate the mower at its full rated PTO speed to maintain blade speed for a clean cut. Refer to the tractor operator's manual or the tractor instrument panel for the engine speed and gear to provide the required PTO and desired ground speed. Make sure that the mower is operating at its full rated speed before entering the vegetation to be cut. If it becomes necessary to temporarily regulate engine speed, increase or decrease the throttle gradually.

Ground speed is achieved by transmission gear selection and not by the engine operating speed. The operator may be required to experiment with several gear range combinations to determine the best gear and range which provides the most ideal performance from the mower and most efficient tractor operation. As the severity of cutting conditions increase, the ground speed should be decreased by selecting a lower gear to maintain the proper operating PTO speed. *OPS-R-0025*

⚠ WARNING Do not exceed the rated PTO speed for the Implement. Excessive PTO speeds can cause Implement driveline or blade failures resulting in serious injury or death. (SG-26)

⚠ WARNING Mow at the speed that you can safely operate and control the tractor and mower. The correct mowing speed depends on terrain condition and grass type, density, and height of cut. Normal ground speed range is from 2 to 5 mph(3-8 kph). Use slow mowing speeds when operating on or near steep slopes, ditches, drop-offs, overhead obstructions, power lines, or when debris and foreign objects are to be avoided. (SGM-07)

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12.4 Operating the Mower

Only operate the mower from the tractor operator's seat with the seatbelt securely fastened. The tractor must be equipped with a ROPS in the raised position or a ROPS cab.

The mower is designed to cut vegetation up to 1-1/2" in diameter. Sharp blades will produce a cleaner cut and require less power. Travel at a speed that allows the mower sufficient time to cut through the vegetation and maintain the PTO operating speed to prevent overloading the mower and tractor. Choose a driving pattern that provides the maximum pass length and minimizes turning.

Under certain conditions, tractor tires may roll some grasses down preventing them from being cut at the same height as the surrounding area. When this occurs, reduce the tractor ground speed while maintaining the operating speed of the mower. A slower ground speed will permit grasses to at least partially rebound and be cut. Taking a partial cut and/or reversing the direction of travel may also help produce a cleaner cut.

Avoid mowing in the reverse direction when possible. In situations where the mower must be backed to access areas to be cut, make sure there are no persons or other foreign debris behind the mower before mowing in reverse. When mowing in reverse, operate the tractor and mower at a reduced ground speed to ensure tractor and mower control is maintained. *OPS-R-0026*

⚠WARNING Do not mow with two machines in the same area except with Cab tractors with the windows closed. (SGM-11)

⚠WARNING Mow only in conditions where you have clear visibility in daylight or with adequate artificial lighting. Never mow in darkness or foggy conditions where you cannot clearly see at least 300 feet (90 m) in front and to the sides of the tractor and mower. Make sure that you can clearly see and identify passersby, steep slopes, ditches, drop-offs, overhead obstructions, power lines, debris and foreign objects. If you are unable to clearly see these type of items discontinue mowing. (SGM-1)

⚠WARNING Avoid mowing in reverse direction when possible. Check to make sure there are no persons behind the mower and use extreme care when mowing in reverse. Mow only at a slow ground speed where you can safely operate and control the tractor and mower. Never mow an area that you have not inspected and removed debris or foreign material. (SGM-08)

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WARNING Follow these guidelines to reduce the risk of equipment and grass fires while operating, servicing, and repairing the Mower and Tractor:

-Equip the Tractor with a fire extinguisher in an accesible location.

-Do Not operate the Mower on a Tractor with an underframe exhaust.

-Do Not smoke or have an open flame near the Mower and Tractor.

-Do Not drive into burning debris or freshly burnt areas.

-Ensure slip clutches are properly adjusted to prevent excessive slippage and plate heating.

-Never allow clippings or debris to collect near drivelines, slip clutches, and gearboxes. Periodically shut down the Tractor and Mower and clean clippings and collected debris from the mower deck. (SGM-12)

12.5 Shutting Down the Implement

To shut down the implement, first bring the tractor to a complete stop. Then slow down the implement by reducing the engine speed before disengaging the PTO. Push the stop button to disengage the wings and wait for all motion to stop before proceeding to drive or shut down the tractor.

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Park the tractor on a level surface, place the transmission in park or neutral and apply the parking brake, lower the attached implement to the ground, shut down the engine, remove the key, and wait for all motion to come to a complete stop before exiting the tractor. *OPS-F- 0011*

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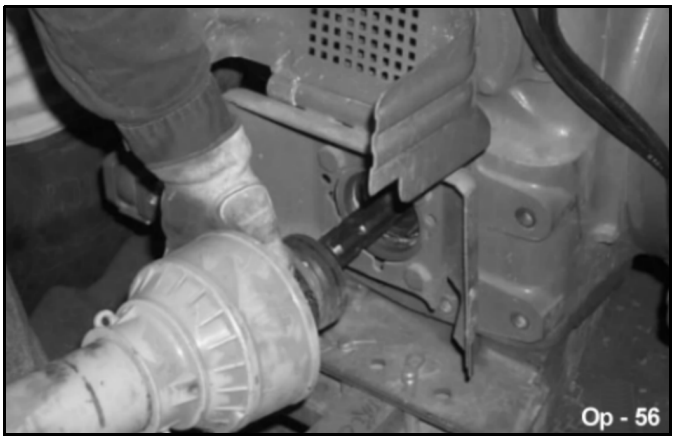
13. DISCONNECTING THE MOWER FROM THE TRACTOR

Before disconnecting the mower, the PTO must be disengaged and all motion at a complete stop. Move the mower to a level storage location and lower both wings to the ground. If the mower will be stored with the sections in the raised position, be sure that the locks are engaged. If the mower is not resting securely on the ground, block the mower up securely before attempting to disconnect it from the tractor. Use extreme care to keep feet and hands from under the mower and clear of any pinch points. *OPS-F-0012*

After disconnecting the 3 lift points, remove the mower driveline from the tractor PTO shaft. Lay the driveline down carefully to avoid damaging the driveline or its shield. Do not let the driveline fall into mud or dirt, which can contaminate the bearing and shorten the life of the driveline. *OPS-F-0013*



⚠ DANGER Never work under the Implement, the framework, or any lifted component unless the Implement is securely supported or blocked up to prevent sudden or inadvertent falling which could cause serious injury or even death. (SG-14)

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MOWER STORAGE

It is recommended that the mower be stored with the center section and both wings fully lowered to ground level. If the mower is stored with the wings in the raised position, select a level area and install wing transport braces to prevent the wings from falling BEFORE disconnecting the mower hitch from the tractor.

Properly preparing and storing the mower at the end of the season is critical to maintaining its appearance and to help ensure years of dependable service. The following are suggested storage procedures:

- Thoroughly clean all debris off the mower to prevent damage from rotting grass and standing water.
- Lubricate all mower grease points and fill gearbox oil levels as detailed in the maintenance section.
- Tighten all bolts and pins to the recommended torque.
- Check the mower for worn and damaged parts. Perform repairs and make replacements immediately so that the mower will be ready for use at the start of the next season.
- Store the mower in a clean, dry place with the mower housing resting securely on blocks or at ground level.
- Keep the driveline yoke from sitting in water, dirt and other contaminants.
- Use spray touch-up enamel where necessary to prevent rust and maintain the appearance of the mower.

It is critical that driveline clutches slip when an obstacle or heavy load is encountered to avoid mower and/or tractor damage. If the mower sits outside for an extended period of time or is exposed to rain and/or humid air, the clutch lining plates must be inspected to ensure they are not frozen together from rust or corrosion. If the mower has been exposed to such conditions, at the start of each mowing season, and any time it is suspected that the slip clutch plates may be frozen together, readjust the slip clutch as detailed in Seasonal Clutch Maintenance of the maintenance section in this manual. *OPS-F-0014*

⚠ DANGER Never allow children to play on or around Tractor or Implement. Children can slip or fall off the Equipment and be injured or killed. Inadvertent contact with controls can cause the Implement to shift or fall crushing themselves or others. (SG-25)

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14. TRANSPORTING THE TRACTOR AND IMPLEMENT

Inherent hazards of operating the tractor and implement and the possibility of accidents are not left behind when you finish working in an area. Therefore, the operator must employ good judgement and safe operation practices when transporting the tractor and implement between locations. By using good judgement and following safe transport procedures, the possibility of accidents while moving between locations can be substantially minimized. *OPS-U- 0017*

⚠ DANGER Never allow children or other persons to ride on the Tractor or Implement. Falling off can result in serious injury or death. (SG-10)

Before transporting the tractor and mower, idle the tractor engine, disengage the PTO and wait for all mower moving parts to come to a complete stop. Raise the mower sections and ensure transport locks engage.

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Ops-1437

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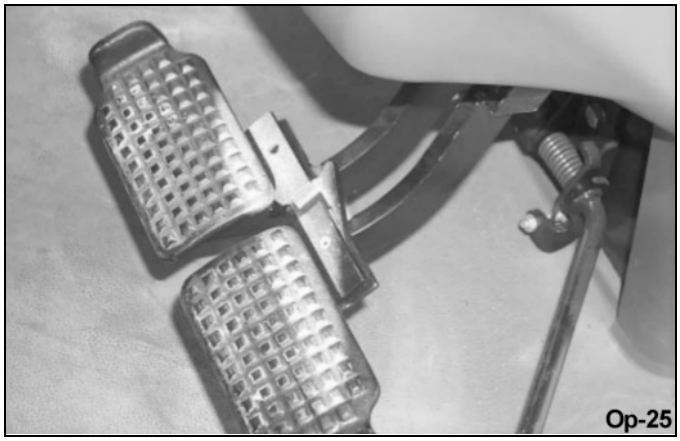
OPERATION

Before transporting the tractor on a public roadway or boarding a trailer for transport, the tractor brake pedals should be locked together. Locking the pedals ensures that both wheels brake simultaneously while stopping, especially when making an emergency stop.

Use extreme caution and avoid hard applications of the tractor brakes when towing heavy loads at road speeds. Never tow the implement at speeds greater than 20 MPH (32 kph). *OPS-U- 0018*


Op-25

If the tractor's hydraulic pump is not independent of the tractor PTO, or if the tractor PTO has to be run to have hydraulic power, disconnect the mower driveline from the tractor PTO output shaft. Secure the driveline to the mower deck to prevent driveline damage or loss during transport.

14.1 Transporting on Public Roadways

Extreme caution should be used when transporting the tractor and implement on public roadways. The tractor must be equipped with all required safety warning features including a SMV emblem and flashing warning lights to alert drivers of the tractor's presence. Remember that roadways are primarily designed for automotive drivers and most drivers will not be looking out for you, therefore, you must look out for them. Check your side view mirrors frequently and remember that vehicles will approach quickly because of the tractor's slower speed. Be extremely cautious when the piece of equipment that you are towing is wider than the tractor tire width and/or extends beyond your lane of the road.

Make sure that a proper size safety tow chain is secured between the tractor and implement before entering a public road. *OPS-U- 0019*

NOTE: *Ensure that the mower sections are fully raised and that the transport locks are engaged for each section.*

⚠WARNING Only tow the Implement behind a properly sized and equipped Tractor which exceeds the weight of the Implement by at least 20%. DO NOT tow the Implement behind a truck or other type of vehicle. Never tow the Implement and another Implement connected in tandem. Never tow the Implement at speeds over 20 MPH. (STI-06)

⚠ DANGER Never allow children or other persons to ride on the Tractor or Implement. Falling off can result in serious injury or death. (SG-10)

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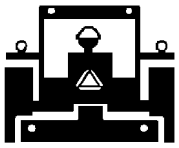
WARNING Make certain that the “Slow Moving Vehicle” (SMV) sign is installed in such a way as to be clearly visible and legible. When transporting the Equipment use the Tractor flashing warning lights and follow all local traffic regulations. (SG-6)



The SMV (Slow-Moving Vehicle) emblem is universal symbol used to alert drivers of the presence of equipment traveling on roadways at a slow speed. SMV signs are a triangular bright orange with reflective red trim for both easy day and night visibility. Make sure the SMV sign is clean and visible from the rear of the unit before transporting the tractor and implement on a public roadway. Replace the SMV emblem if faded, damaged, or no longer reflective. *OPS-U- 0020*

Op-43

Make sure that all tractor flashing warning lights, headlights, and brake/tail lights are functioning properly before proceeding onto public roads. While newer model tractors have plenty of lighting to provide warning signals and operating lighting, most older models are only equipped with operating lights. Consult an authorized tractor dealer for lighting kits and modifications available to upgrade the lighting on older tractor models. *OPS-U- 0021*

Op-595

When operating on public roads, have consideration for other road users. Pull to the side of the road occasionally to allow all following traffic to pass. Do not exceed the legal speed limit set in your country for agricultural tractors. Always stay alert when transporting the tractor and implement on public roads. Use caution and reduce speed if other vehicles or pedestrians are in the area. *OPS-U- 0022*

Op-596

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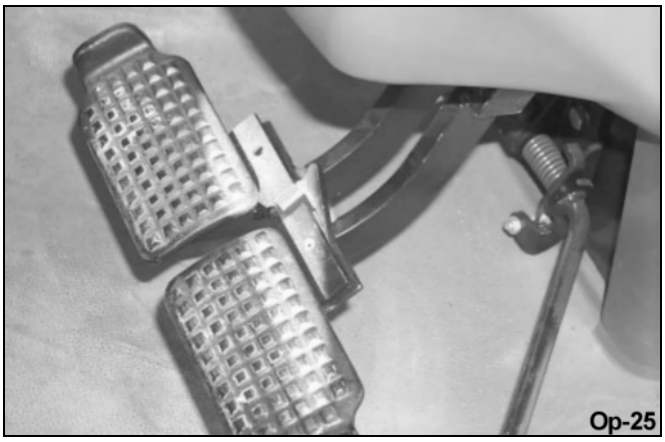
Reduce speed before turning or applying the brakes. Ensure that both brake pedals are locked together when operating on public roads. *OPS-U- 0023*



15. Hauling the Tractor and Implement

Before transporting a loaded tractor and implement, measure the height and width dimensions and gross weight of the complete loaded unit. Ensure that the load will be in compliance with the legal limits set for the areas that will be traveled through.

Use adequately sized and rated trailers and equipment to transport the tractor and implement. Consult an authorized dealer to determine the proper equipment required. Using adequately sized chains, heavy duty straps, cables and/or binders, securely tie down both the front and rear of the tractor utilizing the proper tie down locations as specified by the tractor manufacturer.

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Once the tractor has been loaded onto an adequate rated trailer, raise the side flail/flails into transport position and make sure the control levers are in the center lock position. Ensure the wing start/stop buttons are pushed in the stop position and shut down tractor. Remove key and exit the tractor.

Dual Wing

To exit and enter the tractor with a dual wing Terrain Master you will need to utilize the rear window. Unlatch the window and proceed to exit always using three point contact as shown on ***Figure Ops-1463.***

When completely out of the tractor close window and strap window closed as shown in ***Figure Ops-1464.***

WARNING Use both hands for support when getting on and off the Tractor. Always use three point contact when exiting or boarding Tractor.

Dual Wing w/Remote Valve Option

With units that have a Remote Valve, raise the right hand wing into transport position from the tractor seat. Once the right wing is in transport position, make sure control levers are in the center lock position and wing start/stop buttons are pushed in the stop position. Shut down tractor, remove key and exit the tractor. To raise the left hand wing into transport position you will need to use the Remote Valve installed in front of your tractor. Once left hand wing has been raised and locked into transport position, proceed to strapping the wings together.

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Before tying down tractor with chains secure the flail wings together with a shipping strap. **Refer to Figure Ops-1465**

Arrange the chains so that when tightened the chains are pulling downward and against themselves. Carefully tighten the securing chains or other fasteners using boomers or binders to apply maximum tension. Use extreme care when attaching and removing the securing devices as the extreme tension involved when released has the potential to inflict serious injury.

While hauling the tractor and implement make occasional stops to check that the tractor and implement have not moved or shifted and that the securing chains have maintained tension. If during transport a hard braking, sharp turning, or swerving action was performed, stop at the next safe location to inspect the security of the load.

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16. TROUBLE SHOOTING GUIDE

Problem	Possible Cause	Remedy
Excessive Vibrations	Check gearbox bolts.	Tighten if loose
	Check for missing knives on cutter shaft.	Replace missing knives
	Check to see if knives are free swinging.	Free knives so they swing.
	Blade broken or bent.	Replace blades.
	Cuttershaft bent.	Replace cuttershaft.
	Drivelines not phased correctly.	Replace driveline.
	Implement & Tractor yokes must be in line.	
Gearbox Overheating	Low on lubricant.	Fill to level plug.
	Improper type lubricant.	Replace with proper lubricant.
	Excessive trash build-up around gearbox.	Remove trash.
	Bearing or gears set up improperly.	Consult your Dealer.
Gearbox Noisy	Rough Gears.	Run in or change gears.
	Worn Bearing.	Replace bearing.
Noise	Damaged Belt Shield (Rubbing on pulleys or belt).	Straighten or replace Shields.
	Worn Bearing or Gear.	Replace Bearing or Gear.
Gearbox Leaking	Damaged oil seal	Replace seal.
	Bent shaft.	Replace oil seal and shaft.
	Shaft rough in oil seal area.	Replace or repair shaft.
	Oil seal installed wrong.	Replace seal.
	Oil seal not sealing in the housing.	Replace seal or use a sealant on OD of Seal.
	Oil level too high.	Drain oil to proper level.
	Sand hole is casting.	Replace castings or gearbox.
	Gasket damaged.	Replace gasket.
	Bolts loose.	Tighten bolts.
Clutch Slips Excessively	Clutch linings badly worn or plates warped.	Repair clutch per maintenance section of manuals.
	Too much power for clutch.	Reduce ground speed and material intake.
	Oil on facings.	Replace facings.
	Friction facings glazed.	Clean with emery cloth.

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Knives Wear Too Fast	Cutting in sandy conditions. Cutting in rocky conditions. Soft “will fit” knives.	Increase cutting height. Increase cutting height. Use genuine Alamo Industrial knives.
Hydraulic Cylinder Will Not Operate	Not enough pressure. Valve not connected properly Quick coupler not completely connected.	Check Pressure Re-plumb valve. Complete connection.
Oil Squirting from Breather Vent Hole	Oil leaking by piston ring. Small leakage amount is normal. Piston “O” Ring worn. Cylinder wall scored or pitted. Wrong piston ring on piston.	Do not carry cutter on cylinder. Replace piston “O” Ring. Replace cylinder. Use correct piston ring.
Discharging Bunches or	Belt installed improperly. Blades dull. Grass too wet. Grass too long. Travel speed too fast. PTO RPM too low.	Check belt for correct set-up. Check blades for sharpness. Wait for grass to dry. Mow at 3-1/2” and recut lower. Use a lower tractor gear. Mow at engine RPM to match 540 PTO RPM.
Blades Scalping High Places	Mowing too low. Rough, uneven ground. Turning Tractor too fast.	Raise height of cut. Use a slower speed. Lower rollers. Slow down when turning.
Uneven Cut	Travel speed too fast. Mower deck not level. Blades dull or unbalanced. Deck underside plugged. Grass too high.	Use a slower speed. Level the mowing deck. Sharpen or balance blades. Clean underside of deck. Mow at 3-1/2” and recut lower.
Grass Clippings Windrow or clump	Grass too wet. Grass too high. Housing plugged.	Wait for grass to dry. Mow at 3-1/2” and recut lower. Clean underside of deck.
Grass Not being Cut Evenly	Belt worn or slipping. Spring broke & belt off idler. Housing plugged. Debris around pulleys. Grass too high.	Replace or adjust belt. Replace spring or adjust belt. Clean underside of housing. Remove deck belt shield and clean out debris. Mow at 3-1/2” and recut lower.

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MAINTENANCE SECTION

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DAILY CHECKS

Before operating your Interstater, take the time to inspect and repair any damage to the machine or tractor. Only a minimum of time and effort is required to regularly maintain this machine to provide long life and trouble free operation.

1. Lubricate the INTERSTATER at the specified intervals as outlined in the lubrication diagram. Figure Mnt-FL-0001. All mower grease fittings are equipped with lubricaps which snap over the grease fittings to prevent dirt from entering the fittings. Remove the cap and wipe the fitting before greasing. Wipe the outlet of the grease gun then grease the bearing. When finished, place the cap over the fitting and wipe any excess grease from around the cap. In extremely dusty conditions, it is desirable to lubricate more often than every 8 hours. Grease PTO shaft as outlined on the diagram located on PTO shaft shield. The idler pulleys are equipped with a sealed ball bearing and require no further lubrication. Caster wheel bearings should be repacked at the end of each mowing season and checked before the start of the next season. The gearbox is shipped with the proper amount of SAE No. 90 extreme pressure lubricant. Maintain the level of this oil at the lower 1/8" pipe plug on the gearbox cover. LUBRICATE MOWER BEFORE INITIAL USE.

NOTE: *Lubricate flail roller bearing until lubricant can be seen coming out between roller and bearing housing.*

2. Before each day's use, follow this procedure:

a. Visually check the unit, and make certain all items are properly tightened.

b. Check the pump drive belt tension. If necessary, tighten the belt as instructed in this section.

NOTE: *Cutter unit belt tension is maintained by a spring-loaded idler pulley.*

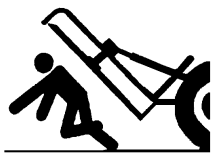
c. Check the reservoir fluid level with the cutter units in the transport position. The oil level should be even with the sight glass located on the reservoir. Before removing filler cap, wipe the top of the reservoir to prevent dirt from entering the tank. Use Chevron 1000 THF or an equivalent.

NOTE: *Your ambient temperature and operating conditions may require a different viscosity oil. Please consult the oil manufacturer for proper specifications.*

NOTE: *If the reservoir needs oil, a leak exists somewhere in the system. Repair the leak before using the unit.*

d. Check the cuttershaft to make certain it is fully knifed. Replace any missing knives or cotter pins, then run the unit at full speed to check for vibrations. Do not operate the unit in an out-of-balance condition.

⚠ DANGER Never work under the Implement, the framework, or any lifted component unless the Implement is securely supported or blocked up to prevent sudden or inadvertent falling which could cause serious injury or even death. (SG-14)



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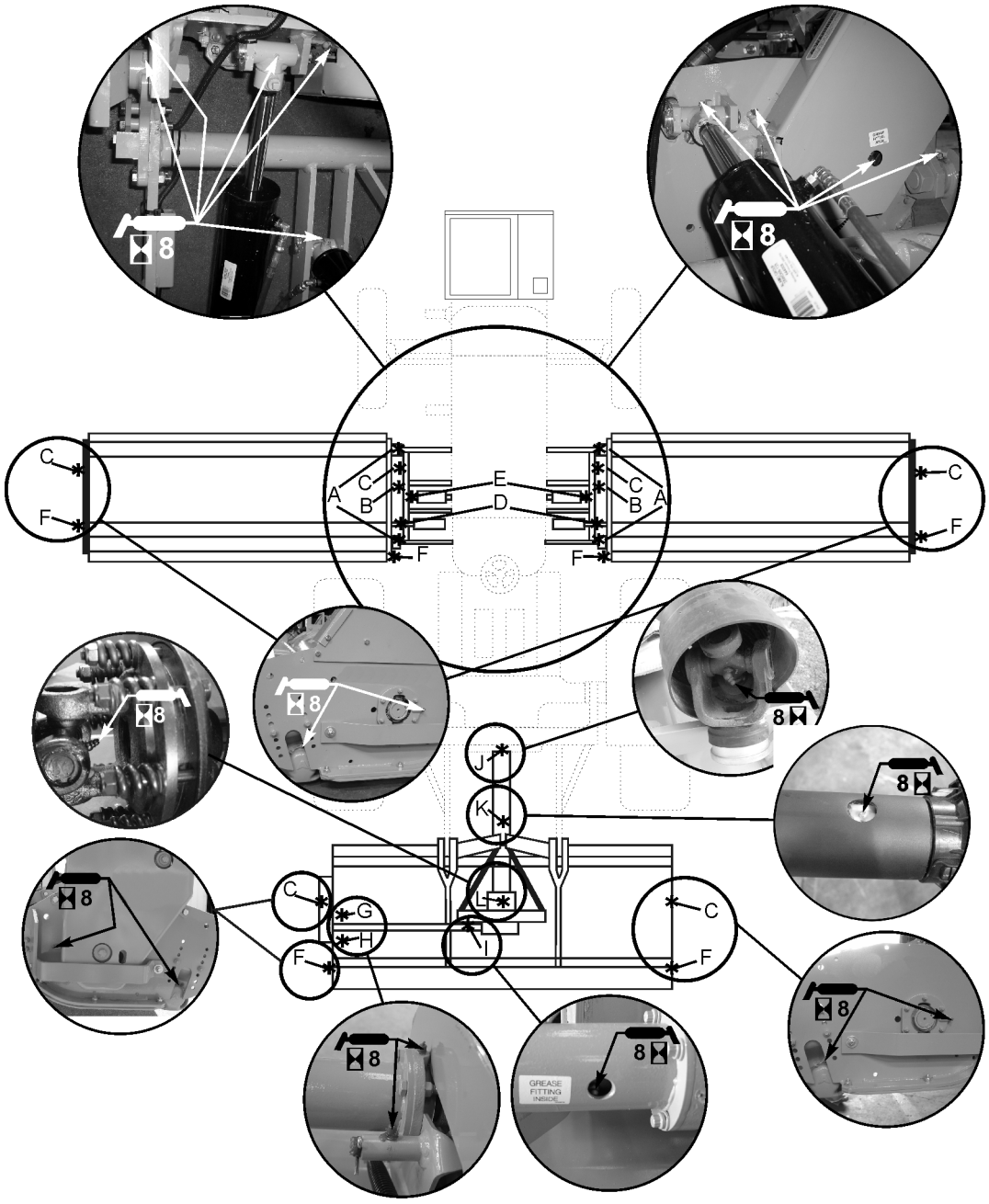

LUBRICATE ALL POINTS EVERY 8 HOURS OF OPERATION

Use NLG1-with Lithium Grease

A	LIFT FRAME POVOT PIN	**G**	REAR MOWER IDLER ARM
B	WING MOWER BELT IDLER ARM	**H**	BANJO BEARING
C	CUTTERSHAFT BEARINGS	**I**	BANJO COUPLING
D	TILT CYLINDER ROD END	**J**	DRIVELINE YOKE
E	LIFT CYLINDER ROD END	**K**	DRIVELINE SHAFT
F	ROLLER BEARING	**L**	SLIP CLUTCH

Mnt-FL-0001

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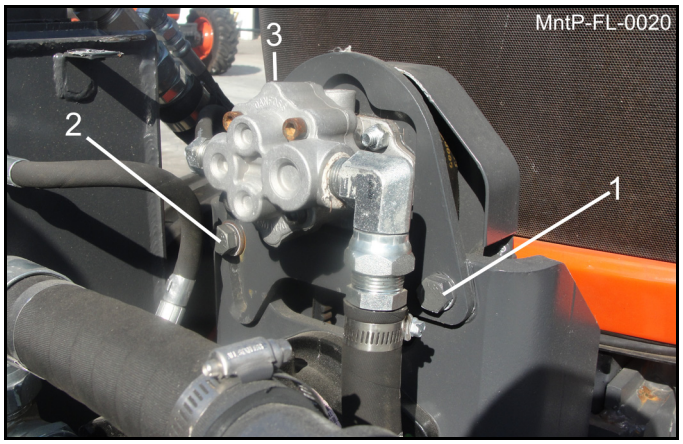
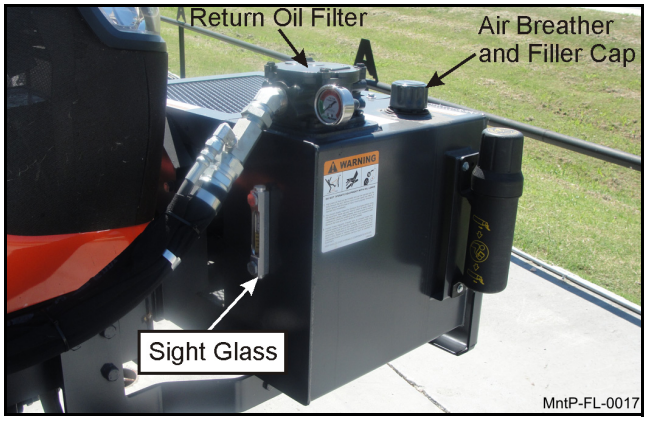
ADJUSTING TENSION OF DRIVEBELTS

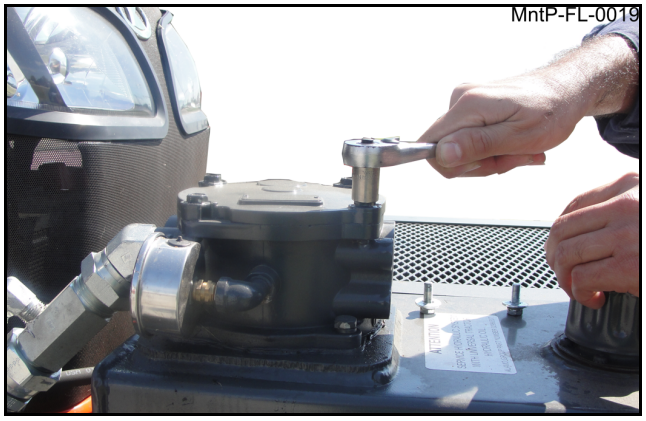
1. Remove Pump Cover.
2. Loosen Pump Mount Plate bolt item 1 and 2. **Mnt-FL-0010**
3. Loosen Belt Tension Bracket bolt item 3. Mnt-FL-0010
4. Move pump unit outwards to increase tension on the belt. Belts should have no more than 1/4 inch play at midpoint between drive pulley and pump pulley. Tighten mounting bolts.
5. Replace Pump Cover.



CHANGING HYDRAULIC SYSTEM FILTER

A large capacity filter is located on top of the hydraulic oil reservoir. **Mnt-FL-0009** The filter will trap particles which are .001 inch or larger. The filter needs to be changed after the first 10 hours of operation and every 200 hours or 12 months thereafter.





1. Clean the filter cover to prevent dirt from entering tank.
2. Loosen the four bolts on the filter cover. **Mnt-FL-0004** Remove one bolt from the filter to aid in removing the filter cover. **Mnt-FL-0005**
3. Push the filter cover down and slowly twist the filter cover off. **Mnt-FL-0006**
4. Remove filter spring. **Mnt-FL-0007**.

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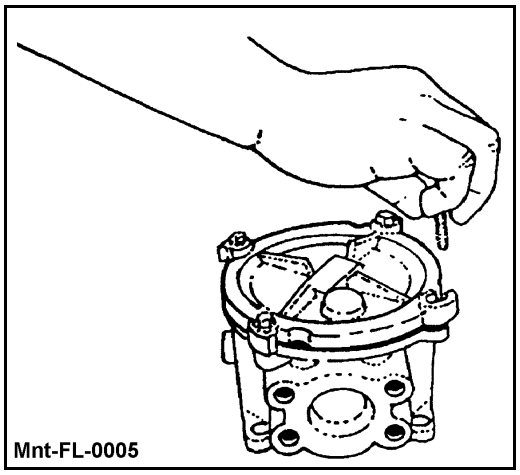
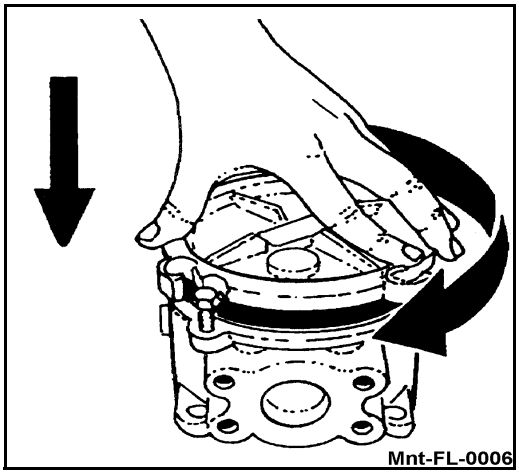
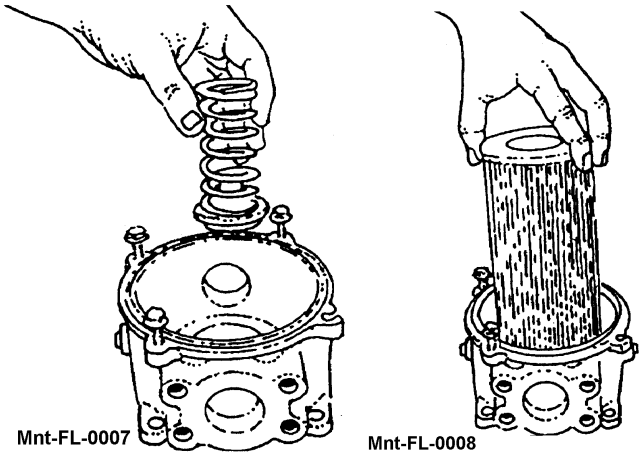

Mnt-FL-0005


Mnt-FL-0006

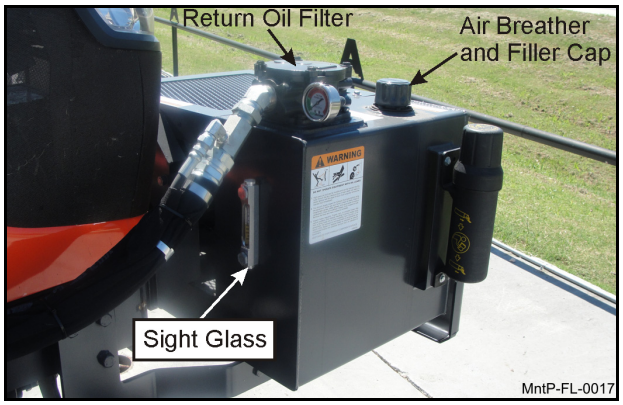
5. Remove filter. Inspect material trapped by the filter. It can indicate parts wear in the system. **Mnt-FL-0008**

6. Install the new filter.

7. Reinstall filter spring and filter cover. Replace the one bolt which had previously been removed. Tighten all bolts in an even manner. Mnt-FL-0009


Mnt-FL-0007

Mnt-FL-0008



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CUTTER UNIT

A. GENERAL

The INTERSTATER electrical circuit controls the flow of oil to the hydraulic motor on the cutter unit. The motor control valve relies on a solenoid to control the spool within the valve and direct the flow of oil.

When the mower ON/OFF switch is in the "ON" position, current flows to the solenoid which positions the spool to direct the oil flow from the pump to the motor. The oil then turns the motor which drives the cuttershaft.

When the mower ON/OFF switch is in the "OFF" position, the solenoid is not energized and oil pressure in the power circuit pushes the spool back allowing the oil to return to the reservoir from the valve. Without the flow of oil, the motor will no longer drive the cuttershaft.

B. OFF-ON SWITCH

The electrical circuit is connected to the tractor ignition switch. (See Electrical Schematic). The yellow wire connects to the switch accessory terminal and the red wire connects to the start terminal. A 6 amp in-line fuse on the yellow wire protects the off-on switches from an overload. THE OFF/ON SWITCH HAS A SAFETY LOCK-OUT FEATURE THAT WILL NOT ALLOW THE TRACTOR STARTER TO ENGAGE IF SWITCH IS IN THE ON POSITION.

C. SAFETY CUT-OFF SWITCH

In the electrical circuit between the OFF-ON switch and the motor solenoid valve is a safety cut-off switch. This switch is a cam-operated electrical switch that cuts the wing mowers off when the wing is raised to approximately 60 degree angle. This also prevents mower from being operated with the wing up. This feature prevents injury due to inadvertently starting mower with wing raised and should be kept in proper operating condition.

D. SOLENOID OPERATED VALVE AT MOTOR

The electric solenoid valve is mounted in the hydraulic motor manifold block. The solenoid controls the spool within the valve. When the off-on switch is on and the wing is lowered the solenoid in energized by electrical current and the spool is closed to direct the flow of oil from the pump through the cuttershaft hydraulic motor. The wing activates the safety cut-off switch, the electrical current is removed from the solenoid causing the spool to open and allows oil to return to tank without being directed through the motor. Without oil flow through the motor, the cuttershaft will not operate.

GENERAL MAINTENANCE

Mowing is accomplished by a series of knives which rotate at high speed on a shaft. The shaft is driven by a hydraulic motor through a set of drive belts. Belt tension is maintained by a spring-loaded idler pulley.

The cutter unit is mounted to the lift frame by two mounting pins and held in place by a hydraulic cylinder. This cylinder is used to tilt the cutter unit to allow mowing on an angle and tilting to the vertical position for transporting. Another hydraulic cylinder is mounted to the lift frame and the lift cylinder support. This cylinder is used to raise the cutter unit via the lift frame.

The cutter unit rides on a large roller assembly. The position of this roller is adjustable and will determine the cutting height of the knives.

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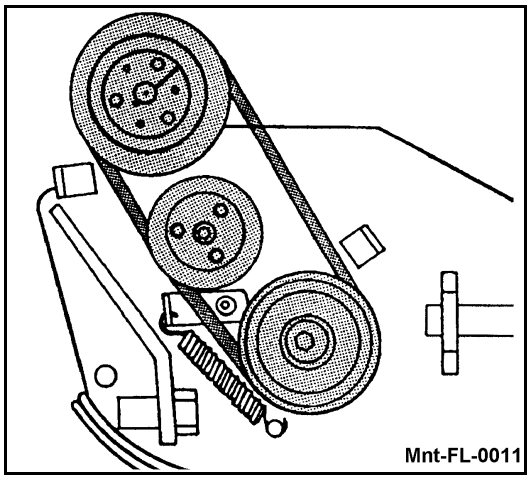
REPLACING CUTTER UNIT DRIVEBELTS

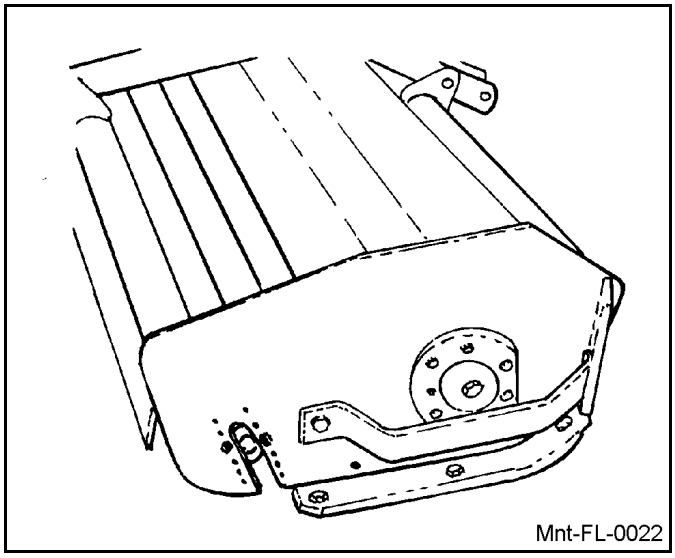
NOTE: *Belts must be replaced as a set. DO NOT replace just one belt.*

1. Place unit on ground or support securely.
2. Remove belt guard.
3. Remove idler arm spring.
4. Remove motor mounting bracket front bolt and loosen rear bolt.
5. Pivot motor-mounting bracket assembly. Remove old belts and install new ones.
6. Reinstall front mounting bolt then secure motor mounting bracket to unit.
7. Reinstall idler arm spring and belt guard.



ADJUSTING CUTTING HEIGHT

1. Lower cutter unit to ground and place control valve levers in "FLOAT" position.
2. Place lifting device (scissors jack, hydraulic jack) under center of cutter housing.
3. Remove hex nuts, washers and carriage bolts from bracket at each end of roller. Make certain that roller bracket is free to move once the fasteners are removed. A stuck roller could drop suddenly and cause an injury.
4. Use lifting device to reposition cutter housing to desired cutting height. Align bracket holes with cutterhousing holes, then reinstall fasteners. Refer to cutting height decal on mower or Safety Section.
5. Lower cutter unit to ground; then remove lifting device.



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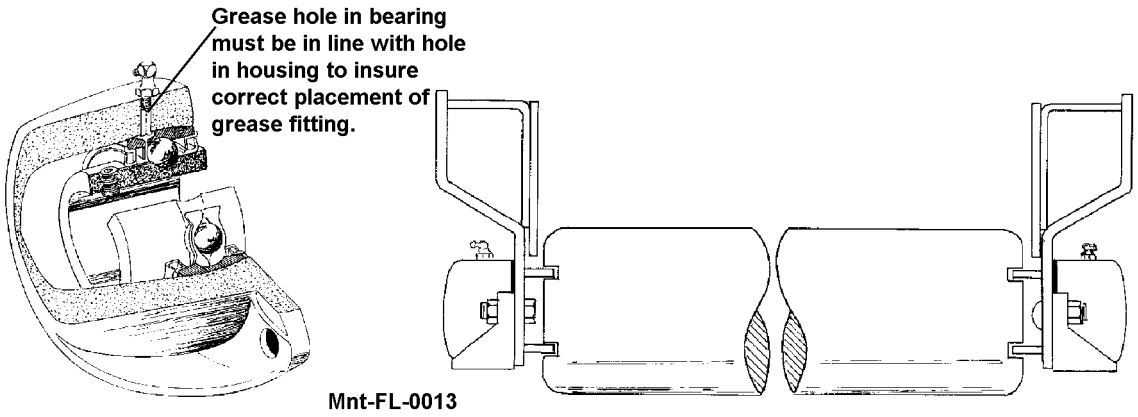
ROLLER BEARING REPLACEMENT

⚠ CAUTION Securely support mower while removing and installing roller assembly.



Mnt-FL-0013

1. Remove roller and both bearing and bracket assemblies from mower. Lift the mower only high enough to remove the roller assembly. If installing a roller with pre assembled bearing and bracket assemblies, remove the old roller, proceed to step 11.
2. Slide bearing and bracket assemblies off each end of roller. If replacing with new bearing and bracket assemblies, proceed to step 9.
3. Remove roller bearing and housing assembly attaching hardware. Remove assembly from bracket. Inspect seal between assembly and bracket for brittleness, cracks, wear and tear. Replace if necessary. If replacing with new roller bearing and housing assemblies, proceed to step 8.
4. Remove grease fitting from the top of bearing housing.
5. Remove bearing form housing. By Rotating Bearing 90deg. sideways and line up with notches in Bearing Housing: then pull out.
6. Install new bearing into housing. Bearing must be installed with grease hole in bearing aligned with grease fitting hole in housing.
7. Reinstall grease fitting to housing. Grease fitting must be tight and seated in grease hole in bearing to prevent bearing from rotating in housing.
8. Attach roller bearing and housing assembly to bracket with seal between housing and bracket.
9. Slide bearing and bracket assemblies on each end of roller.
10. Check bearing for proper installation in housing by gently rocking bearing and bracket assembly in end of roller. Play should be slight to none at all.
11. Install roller and bearing and bracket assemblies on mower.
12. Lubricate roller bearing until lubricant can be seen coming out between roller and bearing housing.

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CUTTERSHAFT BEARING REPLACEMENT

Outboard Bearing

1. Lift cutter unit to maximum horizontal height; then securely support ends of cutterhousing.
2. Remove enough knives to place a floor jack under center of cuttershaft.
3. Securely support cuttershaft.

NOTE: *The cuttershaft must remain supported while changing bearings.*

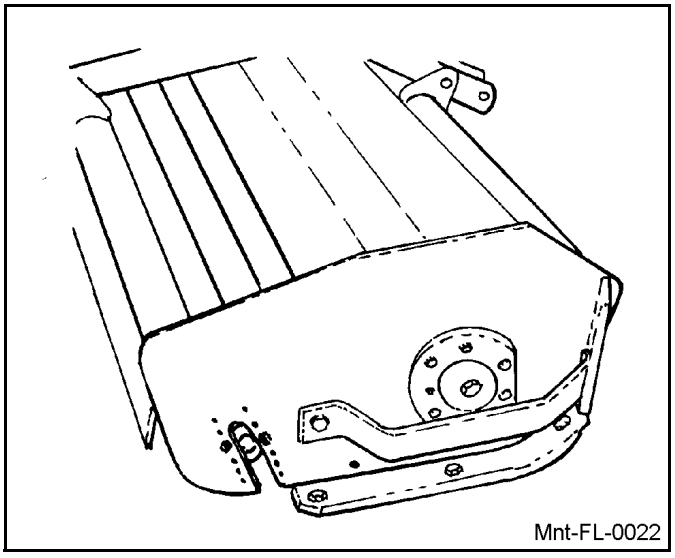
4. Remove outboard fender.
5. Remove fasteners securing bearing and housing assembly to cutterhousing, then remove bearing and housing assembly.

NOTE: *There are two tapped holes in the housing which can be used to pull bearing and housing assembly out by using special tool No. 701627*.

6. Using a jack to align parts, install bearing and housing assembly to cutter unit and make certain that bearing setscrew is located in keyway on cuttershaft. Grease bearing and install cap over fitting.

If only the outboard bearing and housing assembly is to be replaced, proceed as follows: Remove jack and check shaft rotation. Reinstall knives which were removed. Reinstall outboard fender. Remove supports, lower unit to ground and test unit.

If the inboard (drive) bearing is to be replaced, proceed to step 7.


Mnt-FL-0022

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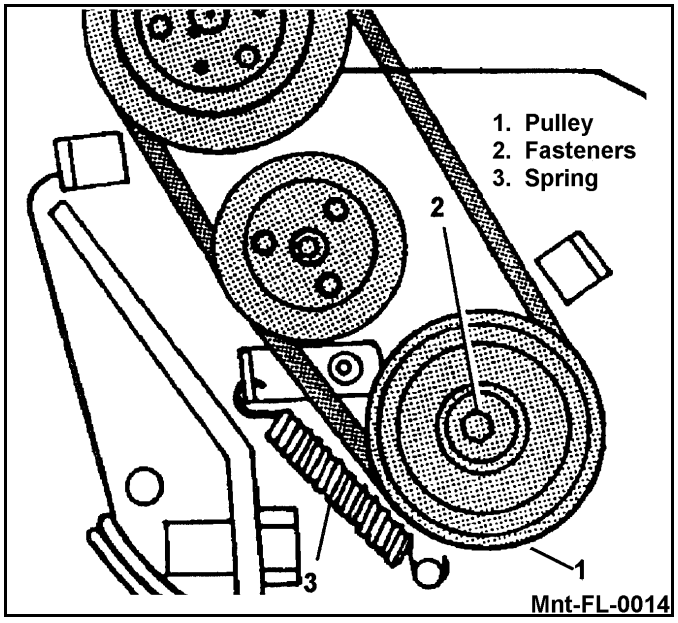
Inboard (Drive) Bearing

1. Remove spring from idler arm. **Fig. Mnt-FL-0013**
2. Remove motor mounting bracket fasteners, at the cutterhousing. Pivot motor- mounting bracket
3. Remove fasteners that secure pulley to cuttershaft. Remove pulley and key.
4. Remove fasteners securing inboard bearing and housing assembly to cutter- housing, then remove bearing and housing assembly. Refer to **Mnt-FL-0011**

NOTE: *There are two tapped holes in the housing which can be used to pull bearing and housing assembly out by using special tool No. 701627.*

5. Using a jack to align parts, install inboard bearing and housing assembly to cutter unit. Grease bearing and install cap over fitting.
6. Reinstall key and pulley. Secure with cuttershaft fasteners.
7. Remove jack and check shaft rotation. Reinstall knives which were removed.
8. Reinstall drive belts then secure motor mounting bracket to cutterhousing.
9. Reinstall idler arm spring.
10. Reinstall belt guard.
11. Remove supports, lower unit to ground and test unit.
12. Reinstall outboard fender, if not already installed.



CUTTERSHAFT REPLACEMENT

NOTE: *It is recommended that cuttershaft bearing and housing assemblies be replaced when replacing cuttershaft.*

1. Place unit on the ground or securely support at a convenient height.
2. Remove cuttershaft bearing and housing assemblies as outlined in Paragraph "E", above. After removing both assemblies, the cuttershaft can be removed and a new one installed. It may be necessary to remove two sets of knives nearest the drive end of cuttershaft.
3. Install new bearing and housing assemblies as outlined in Paragraph "E".

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CHANGING TO FORWARD OR REVERSE ROTATION

Wing Mowers

The hydraulic wing motors are dual rotation motors which means they will rotate in either direction depending on the inlet port used. An arrow on the flat surface of the motor housing at both ports indicate the direction of rotation. To change rotation, remove the four bolts that mount the manifold block to the motor. Remove the case drain hose at the motor, but leave it attached in present location at the manifold block. Leave all other plumbing as presently installed at the manifold block. Remove the two mounting bolts at the motor mounting plate and rotate the motor 180 deg. This changes the present inlet port into the outlet port of the motor. Re-install manifold block but do not change the position. Install case drain hose.

Rear Mower

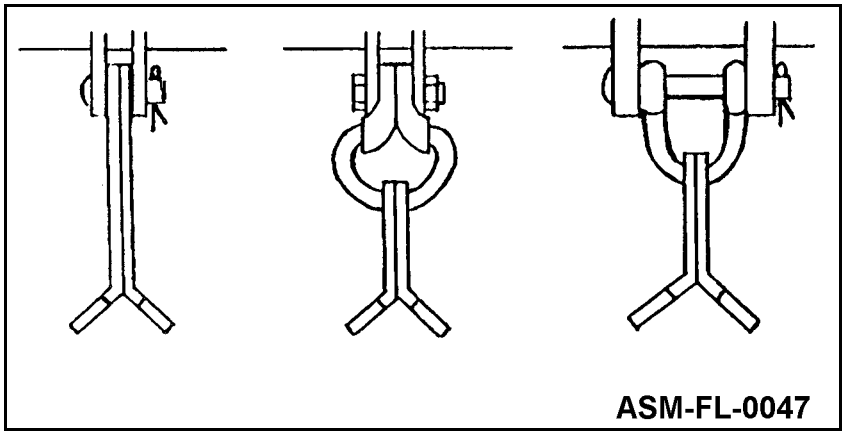
To change direction of cuttershaft rotation for the rear mover, three left hand parts are required. A belt guard, an outboard bearing plate and a idler pulley arm. (Consult parts book for these part numbers). Remove the cuttershaft and turn 180 deg. Remove the gearbox cuttershaft drive pulley and outboard bearing plate, (using the proper bearing plate) mount the plate to opposite side of mower housing. Remove the four bolts that mounts the gearbox and rotate gearbox 180 deg. to new position. Install cuttershaft pulley, gearbox output pulley, idler arm pulley assembly and belt. REPLACE EXISTING BELT GUARD WITH PROPER GUARD.

REPLACING CUTTER UNIT KNIVES

The cutter knives are attached to the cutter shaft with hardened pin and cotter pins. These pins are supplied with the knife kit. To remove existing knives, remove and discard these pins and install new knives using new pins. **Figure ASM-FL-0047**

FOR FORWARD ROTATION: On the right wing and rear unit, all knife pins must be installed with their heads facing away form the cuttershaft pulley. On the left wing, the heads of the knife pins must face the cuttershaft pulley.

FOR REVERSE ROTATION: On the right wing and rear unit, all knife pins must be installed with their heads facing toward the cuttershaft pulley. On the left wing, and rear unit, the heads of the knife pins must face away from the cuttershaft pulley.



ASM-FL-0047

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HYDRAULICS

General

The INTERSTATER hydraulic system consists of two circuits. The power circuit drives the cuttershaft. The control circuit lifts and tilts the cutter unit.

A tractor with a cutter unit installed on each side will have two independent power circuits with two sets of lift and tilt cylinders, and one control circuit with a four-section control valve (instead of a two section valve).

NOTE: It is important that pipe thread sealant be used on solid connections only; never on connections between swivel fittings or fittings with “O” rings and straight threads. Use pipe thread sealing compound. DO NOT substitute other types of sealant, such as teflon tape, paint, shellac, etc.

Initial Start-Up Procedures

Whenever the hydraulic system is drained in order to service a hydraulic component, the following start-up procedure should be completed.

1. Check all nuts and hex head capscrews to be sure they are tight and that all lock washers are fully compressed.
2. Check all hoses and hydraulic connections to be sure that they are tight.
3. Inspect all moving parts, and make certain that no wires or hoses will be caught or pinched when the tractor is in operation.

   Secure all wires and hoses.
4. Thoroughly lubricate the INTERSTATER. Refer to SECTION 2, Illustration 4.
5. Change the hydraulic filter and fill the reservoir to the sight glass with new hydraulic oil. Refer to SECTION 1 for specifications.

⚠ CAUTION Remove all objects from, and stand clear of the front of the cutter unit. DO NOT GET NEAR ROTATING KNIVES.

6. Turn mowers off, then start tractor and run engine at low idle. Operate the lift and tilt circuits, and the power circuit (turn cutter units on ONLY when mowers are fully lowered). Operate until the system is fully charged. Recheck the fluid level and add oil, if necessary. If undue noise continues after the system is fully charged, stop the unit and determine the cause.
7. After the hydraulic system is fully charged and functioning properly, switch the mowers on and increase the engine speed to run the PTO at 540 RPM. Maintain this speed for 5 minutes and look for any leaks or possible problems.

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Troubleshooting

The following shows various problems, the apparent cause, and the recommended procedure for their correction.

PROBLEM	POSSIBLE CAUSE	REMEDY
Mower will not rotate	In line Fuse blown.	Replace Fuse.
	Safety switch not making contact.	Adjust or replace Safety Switch.
	Broken Drivebelts.	Replace Belts
	On/Off Switch bad.	Replace On/Off Switch
	Insufficient voltage through Solenoid.	Check Coil and Wires.
	Solenoid Spool will not shift completely.	Clean or replace Solenoid Cartridge.
Mower will not stop.	Solenoid Spool will not shift.	Clean or replace Solenoid Cartridge.
Intermittent mowing power.	Safety Switch maladjustment	Adjust Safety Switch.
	Electrical problem.	Trace Electrical Circuit for short.
	Bad Solenoid.	Replace Solenoid Coil.
Insufficient cutting power or low Cuttershaft speed.	Drivebelts slipping.	Readjust Belt tension and check.
	Bound Shaft.	Free the Shaft.
	Relief Valve setting too low.	Adjust Relief Valve.
	Solenoid Spool will not shift completely.	Replace Valve Cartridge.
	Worn Pump or Motor.	Replace or rebuild.
Hydraulic Oil overheating Mower free to rotate.	Low Fluid level.	Fill to proper level.
	Relief Valve setting too high.	Adjust Relief Valve.
	Obstruction in Power Circuit-Extra or Will-Fit Parts.	Remove obstruction & Extra Items which are not standard.
Pump making loud noise.	Low Oil level.	Add Hydraulic Fluid.
	Vacuum in reservoir.	Clean or replace Vent Plug.
	Clogged Oil Filter.	Replace Filter.
	Worn Pump.	Replace or rebuild.
Mower will not raise or raises slowly.	Slow Gear Pump speed.	Check Belts, Idler Pulley, Spring.
	Relief Valve Setting too low.	Adjust Relief Valve.
	Worn Gear Pump.	Replace or rebuild.
	Worn Cylinder.	Replace or rebuild.
	Worn Control Valve.	Replace Valve Section.

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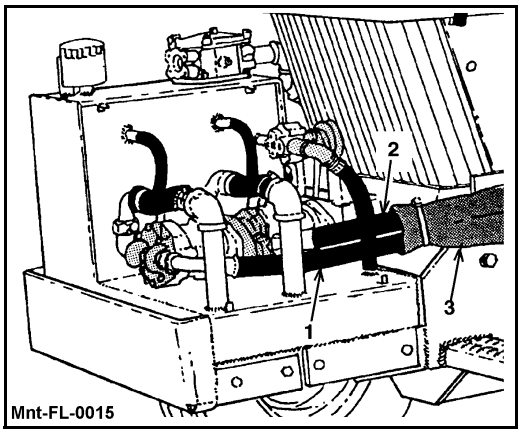
POWER CIRCUIT

The pump unit assembly is made up of the oil reservoir, and hydraulic pump. The pump is driven by the engine crankshaft through a drive shaft. Therefore, oil is being pumped whenever the engine is running. When the mower is off, oil is directed to the reservoir by the solenoid motor control valve and does not flow to the cutter motor. Cooling is provided by patented in frame cooling tubes in the wing mowers.

Replacing Hydraulic Pumps

The pump unit assembly is made up of the oil reservoir, and hydraulic pump. The pump is driven by the engine crankshaft through a drive shaft. Therefore, oil is being pumped whenever the engine is running. When the mower is off, oil is directed to the reservoir by the solenoid motor control valve and does not flow to the cutter motor. Cooling is provided by patented in frame cooling tubes in the wing mowers. **Figure Mnt-FL-0015**



Replacing Outer Pump

1. Remove the Pump Cover by unscrewing the four thumb screws which hold it in place.
2. Disconnect the outer Pump Suction Hose, Pump Drain Hose, and the Pressure Hose.

NOTE: *Clean spills at once. Cap all hoses immediately to prevent contamination of the hydraulic system.*

3. Remove the two bolts which attach the outer pump to the inner pump flange.
4. Remove Pump. Lightly oil new "O" Ring and place on inner pump flange. Install the new Pump with the pump drain ports facing Hydraulic Tank.
5. Reinstall hydraulic hoses. Tighten hose fittings to their proper torque. Refer to Torque Chart.
6. Reinstall Pump Cover and tighten the four thumb screws securely.
7. Replacing Inner Pump:
8. To replace inner pump both pumps must be removed. Follow same procedure as for outer pump. BE SURE TO CAP ALL HOSES AND CLEAN OIL SPILLS AT ONCE.

NOTE: *Clean spills at once. Cap all hoses immediately to prevent contamination of the hydraulic system.*

9. Separate the inner pump from the outer pump and install new pump to inner pump following step 4 making sure both case drain ports are facing hydraulic reservoir.
10. Reinstall pumps to pump mounting bracket.
11. Reinstall all hoses. Tighten hose fittings to their proper torque refer to torque chart.
12. Reinstall all guards.

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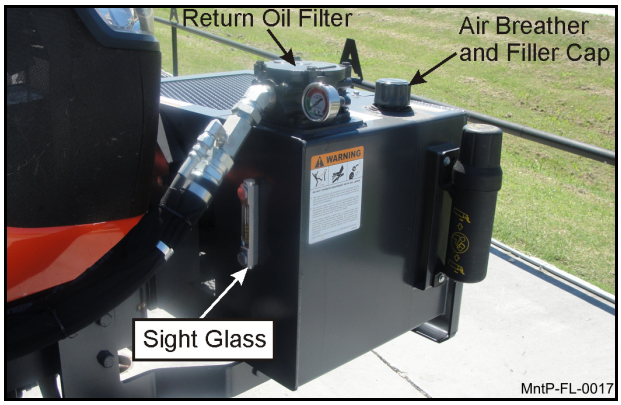
Reservoir

The reservoir stores hydraulic system oil. The breather cap which is mounted on top of the reservoir prevents a pressure buildup or vacuum from occurring in the tank as oil level changes. Their is also an oil filler cap which is used to fill the reservoir with oil. To help prevent dirt from entering the tank, clean the top of the reservoir before removing the cap. THE BREATHER CAP HOLDS APPROX 11 PSI PRESSURE IN TANK. REMOVE FILLER CAP SLOWLY



The oil level sight glass is located on the back of the reservoir. The oil level should be even with the sight glass and checked with the cutter unit in the transport position. The oil temperature should not exceed 180 deg.F.

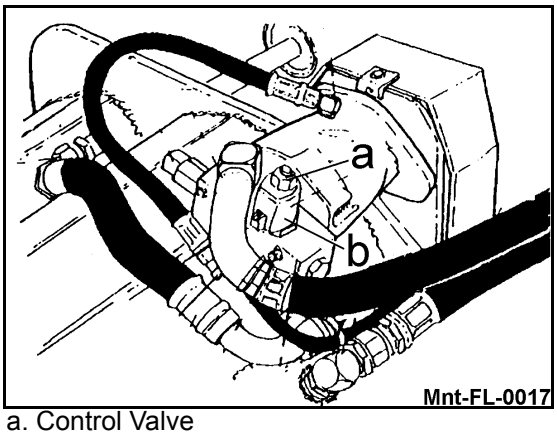
The oil return hoses are connected to the hydraulic filter on top of the reservoir. Oil is returned from cutter unit cooling tubes and filtered before entering the hydraulic reservoir. Oil returning from the control circuit also enters the reservoir thru the filter. Use Chevron 1000THF or an equivalent.

Note: Your ambient temperature and operating con ditions may require a different viscosity oil. Please consult the oil manufacturer for proper specifications.

Solenoid Control Valve

The solenoid control valve directs oil flow from the hydraulic pump. When the mower ON/OFF switch is in the "ON" position, the solenoid is energized and the spool within the valve is positioned to direct oil to the cuttershaft motor.

When the mower ON/OFF switch is in the "OFF" position, oil pressure within the valve pushes the spool back which allows the oil to circulate through the cutter unit before returning to the reservoir. When the flow of oil to the motor is cut off, the cuttershaft will stop rotating. **Figure Mnt-FL-0017**



a. Control Valve

b. Solenoid

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Checking Solenoid Valve

1. With engine running, turn the mower ON/OFF switch in the "ON" position. Check voltage level at the solenoid.
2. If it is less than 12 volts, check wiring and ground connections. Checking ground wire is as important as checking the hot wire. If voltage is sufficient, the solenoid valve is bad and will need to be replaced.

Hydraulic Pump

DISASSEMBLY

1. Disconnect all hydraulic lines. Remove pump assembly from tractor.
2. Plug all ports and thoroughly clean outside of pump.
3. Clamp the end of the drive shaft in a protected jaw vise with the body of the pump up and remove the six cap screws from the back plate.
4. Use a plastic mallet and tap the back plate assembly to loosen it, then pull back plate straight up until it is free. Remove gasket.
5. Remove pump from vise and remove rotating assembly from pump housing.
6. If the pistons did not come out with the piston block, remove them, the spider, and the spider pivot.
7. The piston block assembly need not be disassembled unless the internal pins of spring is damaged.

⚠ CAUTION The following procedure should be used if the spring is to be removed from the piston block assembly. The spring is highly compressed and the snap ring should not be removed without first compressing the spring.

The following parts will be needed to disassemble the piston block:

2 ea. 3/8 I.D. x 1-1/8 O.D. flat washer

1 ea. 3/8 x 3-1/4 N.C. capscrew

1 ea. 3/8 N.C. nut

Place one of the flat washers over the 3/8 x 3-1/4 cap screw and place this through the center of the piston block. Place the other washer over the cap screw and let it rest on the three pins. Screw the nut on and compress the spring inside the piston block. Use a pair of snap ring pliers and remove the internal snap ring. Remove the bolt and the two washers. Remove the washers, spring, three pins, and the internal pin keeper.

8. Remove snap ring from housing. Press shaft from housing and remove shaft seal and washer.
9. Remove the two snap rings, thrust bearing, and two thrust washers from the drive shaft.
10. To remove the cam plate from housing, remove the four screws from sides of the housing. Remove trunnion cover, seal cover, and o-ring cover. Remove o-ring, seal, two washers, inner race, and needle bearings. The cam plate can now be moved over to one side and removed. The cam plate pivot bearing are a loose slip fit into the housing. Do not be concerned if they are not tight.

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Inspection of Hydraulic Pump

1. Inspect flat surface of the backplate. The finish on the piston block side should be smooth and free of grooves. DO NOT LAP BACKPLATE WEAR SURFACE. The backplate should be replaced if it shows any of the wear characteristics outlined above. Inspect the needle bearing in the backplate. If the needles are free of excessive play and remain in the bearing cage, there is no need to replace the bearing.
2. Inspect the piston block. The wear surface that contacts the backplate should be smooth and free of grooves. DO NOT LAP PISTON BLOCK.
3. The pistons should move freely in the piston block bores. If they are sticky in the bore, examine the bore for scoring or contamination.
4. Examine the O.D. of the pistons for finish condition. They should not show wear or deep scratches. The shoes should be a snug fit on the ball end of the pistons. The flat surfaces of the shoes should be flat and smooth. DO NOT LAP THE PISTON SHOES.
5. Examine the spider. It should be flat, no cracks and no signs of wear in the pivot area.
6. Examine the pivot. It should be smooth and show no signs of wear.
7. The cam plate should be inspected for the condition of the finish of the polished shoe surface. It should show no signs of scoring. Inspect the cam plate pivot bearings. If the needles are free of excessive play and remain in the bearing cage, there is no need to replace the bearing.
8. Inspect the drive shaft for fretting in the bearing and spline areas.
9. Inspect the thrust bearing and thrust washers for wear.
10. Inspect the needle bearing in the housing. If the needles are free of excessive play and remain in the bearing cage, there is no need to replace the bearing.

REASSEMBLY

1. Clean all parts in a suitable solvent. Lubricate all critical moving parts before reassembly. If necessary, install new needle bearing in housing with numbered end of bearing outward.

2. Insert cam plate into housing. Insert needle bearings and inner race. The chamfered I.D. of the race should be inward. Install washers, o-ring seal, o-ring cove, trunnion cover, seal cover, and retain with four screws and tighten to 36-48 in. lbs.

3. Install snap ring on shaft. Install thrust washer, thrust bearing, and second thrust washer. Secure with second snap ring.

4. Install shaft in housing and install washer and shaft seal and retain with snap ring.

5. Compress pin keeper and install in the spline of the piston block. Install the three pins with head end to the inside of the block, and install in the special grooves of the piston block spline.

6. Install washer, spring, and second washer in the piston block. Use the two 3/8 I.D. washers and the 3/8 x 3-1/4 cap screw to compress the spring and retain with snap ring. Remove the 3/8 x 3-1/4 cap screw and the two washers.

7. Install the pivot, spider, and the piston assemblies in the piston block. Install this assembly in the housing assembly. The piston shoes must be in contact with the cam plate. Be sure all the parts are in their proper position.

8. Clamp this assembly in a protected jaw vise with the open end of the housing up.

9. Install new gasket.

10. Install relief valves and springs into backplate.

11. Install backplate assembly. Install six cap screws and torque to 27-31 ft. lbs.

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POSSIBLE TROUBLE	CAUSES	REMEDIES
System will not operate in either direction.	Oil supply low. Oil Filter clogged. Oil too heavy. Drive Coupling broken.	Check oil level and fill. Replace Filter Element. Use proper viscosity oil. Inspect Coupling for sheared Spline Spline or Key.
System noisy.	Air in system due to low oil level. Loose Suction Line. Clogged Suction Filter. Internal Pump or Motor damage.	Fill in reservoir to sight glass. Tighten Fittings. Replace Filter Element. Disassemble, inspect, and repair.
Sluggish response to acceleration	Air in system. Internal Pump or Motor wear or damage.	See Step 1A, 1B, 1C, 2B Disassemble, inspect, and repair.

WARNING
USE PAPER OR CARDBOARD TO CHECK FOR LEAKS. NEVER USE YOUR HAND. IF OIL PENETRATES SKIN, GANGRENE OR OTHER SERIOUS INJURY COULD OCCUR.
GET IMMEDIATE MEDICAL ATTENTION.
See Operator's Manual.
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Hydraulic Motor Disassembly

1. Clean outside of unit thoroughly. Refer to Hydraulic Motor illustration in the Parts Listing section.
2. Clamp shaft in a protected jaw vise with backplate end up.
3. Remove six cap screws from backplate.
4. Use a plastic mallet and tap the backplate to loosen it.
5. Remove o-ring from backplate.
6. Remove the complete piston block assembly from the housing assembly.
7. Remove piston assemblies, spider, and pivot form piston block assembly.
8. The piston block assembly need not be disassembled unless the pins or spring is damaged.

⚠ CAUTION The following procedure should be used if the spring is to be removed from the piston block. The spring is highly compressed and the snap ring should not be removed without compressing the spring.

The following parts will be needed to disassemble the piston block:

2 ea. 3/8 I.D. x 1-1/8 O.D. flat washer

1 ea. 3/8 I.D. x 3-1/4 N.C. capscrew

1 ea. 3/8 N.C. nut

Place one of the flat washers over the 3/8 x 3-1/4 capscrew and place this through the center of the piston block. Place the other washer over the capscrew and let it rest on the three pins. Screw nut on and compress the spring inside the piston block. Use a pair of snap ring pliers and remove the internal snap ring. Remove the bolt and two washers. Remove the two washers, spring, three pins, and pin keeper.

9. Remove thrust race from housing.
10. Remove snap ring from housing.
11. Remove shaft seal from housing.
12. Remove washer from housing.
13. Remove drive shaft from housing.
14. Remove the two snap rings, thrust washers, and thrust bearing, from drive shaft.

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Inspection

1. Wash all parts thoroughly in a suitable solvent.
2. Examine needle bearings in housing and backplate.
3. Inspect thrust washers and thrust bearing. All surfaces should be free of any signs of wear or fretting.
4. Inspect spider and pivot; conical surfaces should be free of wear and score marks.
5. Inspect the pistons: the O.D. surface should be smooth and free of scoring. The shoes should be snug fit to the piston. The face of the shoes should be flat and free of scoring and flaking. DO NOT LAP PISTON SHOES.
6. Inspect the piston block; the bores should be free of scoring. The surface that contacts the backplate should be smooth and free of grooves or metal build-up. Do not lap piston block.
7. Inspect the thrust race; the surface should show no signs of scoring or grooves.
8. Inspect the flat surface on the backplate; it should be free of excessive scoring or metal build-up. DO NOT LAP BACKPLATE.
9. Inspect the drive shaft for fretting in the bearing areas. Check spline area for twisted or broken teeth. If keyed shaft, check for cracked or chipped keyway.

Reassembly

1. Use filtered system oil to lubricate all critical moving parts before assembly.
2. Install one snap ring in rear groove of drive shaft. Install one thrust washer, thrust bearing, and second thrust washer on drive shaft. Install second snap ring in front groove on drive shaft.
3. Replace needle bearing in housing if necessary. Install shaft in housing assembly and install washer. Oil O.D. of new shaft seal and press into position. Retain with snap ring.
4. Compress pin keeper and install in the spline area of the piston block.
5. Install the three pins in the special grooves of the spline and with head end of pin toward inside of bock.
6. Install one washer, spring, and second washer. Use the two 3/8 I.D. washers and the 3/8 x 3-1/4 cap screw to compress the spring and retain with snap ring. Remove the 3/8 x 3-1/4 capscrew and two washers.
7. Install the pivot, spider, and the piston assemblies in the piston block assembly.
8. Lubricate thrust race and install in housing assembly.
9. Install piston block assembly in housing assembly. The piston shoes must contact the thrust race. Be sure all parts are in their proper position.
10. Install new needle bearing in backplate if necessary.
11. Install new o-ring on backplate.
12. Install backplate on housing.
13. Install six capscrews and torque 15-18 ft. lbs.
14. On through shaft type assembly, install shaft seal and snap ring in backplate. Install key in driveshaft.

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Troubleshooting

POSSIBLE TROUBLE	CAUSES	REMEDIES
Motor turns while unloaded but slows down or stops when load is applied	Scored backplate.	Remove backplate and examine surface condition of flat area; if scored, replace backplate. DO NOT LAP.
	Scored or worn piston shoes.	Disassemble motor, examine condition of shoes on pistons; replace pistons as a complete set if necessary. DO NOT LAP
	Low Relief Valve pressure.	Check Relief Valve for proper pressure setting; adjust pr replace Relief Valve.
Motor will not turn.	Severely scored backplate.	Disassemble motor completely. Inspect all parts, clean all parts, replace all worn parts and flush hydraulic system.
Motor free wheels.	Oil-flow and pressure shut off going to motor.	When the hydraulic system is shut off, either by shutting off the engine on a closed loop system or returning the control valve spool to neutral on an open center system, the motor will free-wheel after it has leaked off. This is inherent in the design. On a closed loop or propulsion system, the motor will not free-wheel as long as charge pressure is maintained to and from the motor.
Excessive Case Drain flow.	Excessive internal wear in motor.	Disassemble motor; inspect parts and replace as necessary. Case Drain flow should not exceed 1.5 GPM at full pressure.

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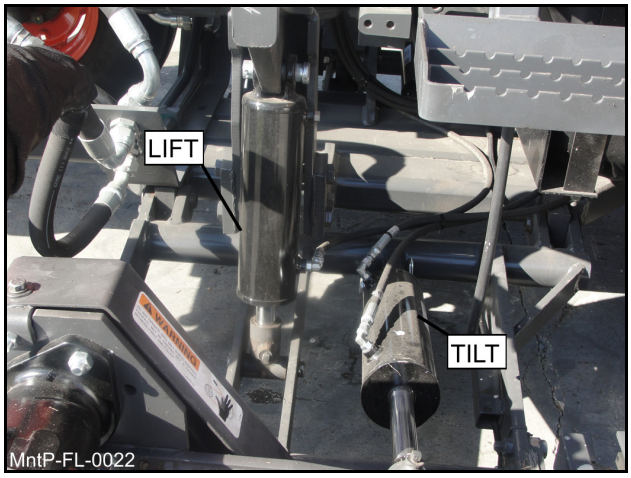
CONTROL CIRCUIT

Lift and Tilt Cylinders

Hydraulic cylinders change the position of the cutter unit. The lift cylinder raises and lowers the unit by changing

position of the lift frame. To lift unit, oil is supplied to rod side of cylinder. Gravity lowers unit when lift levers are in "DOWN" position.

The tilt cylinder changes the angle of the cutter unit. Oil is supplied to both ends of the cylinder and provides power to tilt the unit up or down. The unit can be tilted to the full vertical position for transport.



Lift Cylinder (3-1/4” O.D.)

Tilt Cylinder (3-3/4” O.D.)

Disassembly or Lift or Tilt Cylinder

For part numbers and illustration, refer to the Parts Listing section.

1. Disconnect hoses at cylinder. Cap all hoses to prevent fluid contamination. Remove cylinder from unit.
2. Remove reducer bushing and snap ring which retains the rod guide. Remove rod guide, rod, and piston. Remove guide and piston from rod.
3. Replace all "O" rings, back-up washers, and rod wiper. Inspect rod, guide, piston, and body for damage.
4. Clean inside of cylinder with mineral spirits. DO NOT wipe dry; air dry instead. Lint, dirt, and, grit can cause immediate or premature failure.
5. Lubricate all parts with clean hydraulic oil and reassemble.

Cylinder Rod Maintenance

It is important to visually inspect the hydraulic cylinder rods daily before use. It is highly recommended that while the machine is stored or getting very little use that a protectant is applied to the hydraulic cylinder rods to prevent degradation. If the machine receives more frequent use, be sure to fully cycle each cylinder function so that the cylinder rod is coated by the systems hydraulic fluid. Depending on your operating environment it may be necessary, under normal operating conditions, to apply a protective lubricant to the cylinder rods for protection against rust and pitting. Hydraulic fluid may provide a suitable amount of protection, but remember any protectant can attract dust and debris so attention must be given to the cylinder rods daily. Also remember that any other protectant must be compatible with hydraulic fluid. Alamo Industrial is not responsible for rust or pitting of the cylinder rod due to weather exposure or impacts from normal operation or mounting. If hydraulic cylinders and or the cylinder rods are damaged as a result of the rods rusting or pitting, the hydraulic cylinders and rods will not be covered under warranty by Alamo Industrial.

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Hydraulic Gear Pump

The gear pump, mounted to the pump mount and driven by the crank shaft pulley, produces oil flow for the control circuit. The gear pump inlet is connected, via a hose, to the reservoir which supplies control circuit oil. A high pressure hose connects the pump outlet to the sectional control valve inlet.

NOTE: The gear pump is not used when tractor hydraulics are used to power the control circuit.

MntP-FL-0018

Sectional Control Valve

The control valve directs oil flow from the gear pump to the hydraulic cylinders. In the "HOLD" position, the spool blocks oil flow to the cylinders which prevents movement, and directs oil through the valve back to the reservoir.

When the spool is shifted, oil flows to one side of the cylinder while the other side is opened to the return line. The cylinder rod then moves in or out and changes the cutter unit's position.

In the "FLOAT" position, the spool will open both sides of the cylinder to the return line. The cylinder rod is then free to move since oil can enter or leave either side of the cylinder.

There are two valve sections for each side of the tractor. One is for TILT, one is for LIFT. The sections are bolted together between an inlet and an outlet section. The LIFT section has three positions: UP, HOLD and DOWN & FLOAT. The TILT section has four positions: UP, HOLD, OUT and FLOAT.

A pressure relief valve is mounted in the inlet section of the valve. When a cylinder is bottomed, the relief valve will open and allow oil from the gear pump to return to the reservoir.

MntP-FL-0021

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Checking Relief Valve Pressure

1. To check the relief valve pressure setting, remove inlet hose at the control valve. Install a tee fitting and reconnect the hose to a pressure gauge.
2. Check for proper tension on front drive belts (1/4 inch play at midpoint).
3. Start engine and run at low idle.
4. Raise the Tilt cylinder and note the pressure when the cylinder bottoms.
5. The pressure should be the same on both circuits, 1200 psi. If the pressure is 1200 psi on one and not on the other, the relief valve and the pump are working fine. The problem would be somewhere else.
6. If pressure is low on both circuits, adjust relief valve. Remove hex cap, loosen lock nut (if present) and turn adjusting screw clockwise.
7. If the pressure does not increase, remove the relief valve and inspect it. If the valve is good, the gear pump is worn.

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External Coil Slip Disk Replacement

A. TO DISASSEMBLE EXTERNAL COIL SPRING CLUTCH (Figure Mnt-FL-0024)

Before beginning disassembly, remove or fold shields out of the way and clean off dirt and trash from the area.

1. Remove two Attaching Bolts (6). Remove Clutch Assembly from shaft of Gearbox. Leave Driveline or Driveline Half attached to Clutch.
2. Loosen six Adjusting Bolts (1). **LOOSEN EACH BOLT A FEW TURNS AT A TIME - NOT ALL AT ONCE**. Continue in rotation until Nuts are loose. Remove these Bolts. Flange Yoke (9) will slide off. On Clutches that have Dust Shields (11), Shields will slide off with Flange Yoke. **Note: Some types do not have Dust Shields.**
3. On the opposite side, Outer Flange (2) will slide off which will allow Clutch Plate (3) to slide over notches on outside diameter of Clutch Body (5).
4. Remove Plate with six bolt holes (7). ***Note: Bolts (1) go through these holes.***
5. Remove the four Friction Disks (4) and discard. **DO NO RE-USE.**

B. TO CLEAN AND INSPECT

1. Inspect all components for rust, wear, or damage. Check Spacer (8) for scoring or excessive wear. Clean Clutch Plates and Drive Plates with a wire brush as required to remove any rust.

C. TO REASSEMBLE

1. After all parts have been inspected, cleaned or replaced as necessary, replace components in reverse order from disassembly **USING THE NEW, IMPROVED DISKS.** Do not tighten the six Adjusting Nuts and Bolts (1) until assembly is complete.

D. TO ADJUST

To adjust Slip Clutch, tighten Bolts (1) until the Nut makes contact with Compression Spring (10).

1. After all six Bolts have been assembled so that Nuts contact Springs, mark the position of the top flat on each Nut. Tighten Nuts 1-3/8 turns as follows: **Do NOT** tighten one bolt completely. Tightening as shown in rotation will put equal pressure all the way around on Friction Disks and Drive Plates.
    a. Tighten the Nuts (1) one-half turn in rotation.
    b. Tighten one-half turn again until the marks on the Nuts are on top as in the beginning.
    c. Then, carefully tighten 3/8 of a turn. As a double check, the Springs should now be **COMPRESSED TO 1-11/32" (1.34") TO 1-5/16" (1.31") long.**
1. Re-assemble Clutch to Gearbox. Tighten Bolts (6) securely.
2. Clutch slips too easily, **STOP PTO AT ONCE.** Tighten each Adjusting Nut (1) **NO MORE THAN ¼ TURN AT A TIME. NEVER TIGHTEN SPRINGS SHORTER THAN 1-9/32" (1.28") LONG EVEN AFTER DISK WEAR.**

NOTE: EXCESSIVE SLIPPING WILL BURN UP DISKS AND SLIP CLUTCH *TO THE POINT WHERE THE CLUTCH IS NOT REPAIRABLE. HOWEVER,* ***EXCESSIVE TIGHTENING WILL PREVENT THE SLIP CLUTCH FROM SLIPPING*** *AND CAN LEAD TO FAILURES OF DRIVETRAIN COMPONENTS WITH RESULTING DOWNTIME.*

E. TO REPLACE SHIELDS

1. Make certain that all Driveline Canopy Shields are in good repair and rotate smoothly on the Drivelines. Replace Bearings and/or Integral Shields if necessary.
2. Re-install Gearbox Canopy Shields with the same hardware and tighten securely.

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Slip Clutch

A slip clutch is incorporated in the PTO driveline. It is designed to slip, absorb the shock load, and protect the driveline.

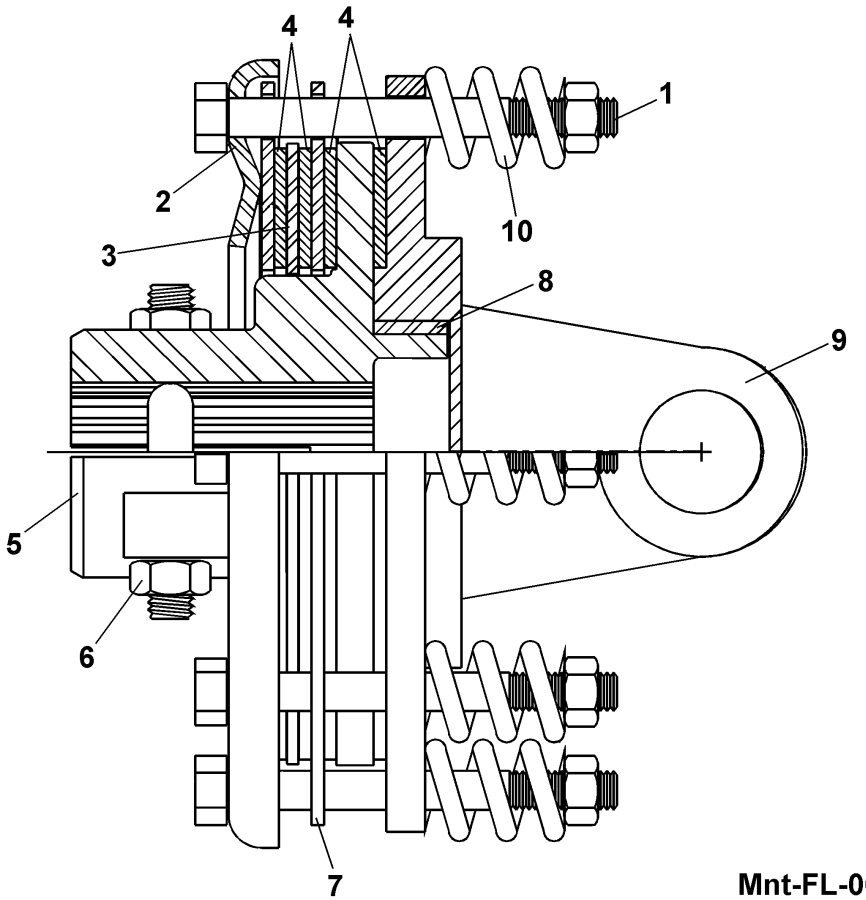
After the first hour of operation, the slip clutch should be checked for overheating. After this first check, the slip clutch should be checked weekly or anytime there is overheating. To adjust the slip clutch, tighten the spring bolts 1/8 (maximum) turn at a time. Bolts should NEVER be adjusted to the point where the springs are compressed solid. Minimum spring length is 1-1/8".

The slip clutch should be checked periodically and adjusted to compensate for wear. The lining plates are 1/8" thick when new. Replace after 1/32" wear. If the mower has been idle for an extended period of time, or in wet weather, before operating check to be sure the friction lining plates are not frozen or rusted together. Should this freezing occur refer to the procedure described in the "Seasonal Clutch Maintenance" section on the next page.

There are four friction lining plates in the slip clutch. These should be checked weekly for oil or grease, wear, and moisture which could cause corrosion on the drive plates.

TANK FILLING INSTRUCTIONS

USE Tractor Hydraulic Oil only



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SEASONAL CLUTCH MAINTENANCE

It is important that the clutch lining plates slip when an obstacle or load heavier than clutch setting is encountered. Therefore, if the machine sits outside longer than 30 days and is exposed to rain and/or humid air it is important to make sure that the clutch lining plates are not rusted/corroded together. Before using the mower use the following procedure to make sure the clutch will slip and give the overload protection required.

1. Loosen nuts on springs until the springs can freely rotate, yet remain secure on bolts.
2. Attach mower to tractor and start the tractor. Set the engine speed at 1200 RPM.
3. Mark outer plates as shown in.
4. Engage the PTO (approximately one second) and then quickly disengage it. The friction lining plates should break loose (check the mark).
5. Turn tractor off and tighten the nuts on the springs to their original position of 1-5/16" compressed spring length.

A double wing Interstater with 74" wing mowers will require approximately 26 gallons of oil to fill the hydraulic tank, hoses, cylinders and cooling tubes in the mower deck. An Interstater with 60" wings will require less oil and with 88" wings will require more oil. The Hydraulic tank only holds 15 gallons of oil and you can not add enough oil to the tank the first time to completely fill the system. Oil should be changed after the first 200 hours of operation and every 400 hours of 12 months of operation thereafter.

The following filling instructions must be carefully followed to prevent pump cavitation and instant pump failure.

1. After the Interstater mower is completely assembled to the tractor and with the wings on the ground, fill the mower hydraulic tank above the oil level sight gauge approximately 5" or 1" below the top of the tank.
2. Start the tractor and run it for 30 to 45 seconds and then turn it off.
3. Check the oil level in the sight gauge. If no oil is seen, add oil to bring the level up to the sight gauge.

NOTE: *Do not fill the tank with oil above the level of the sight gauge after the first filling. Overfilling the tank with oil after the initial filling may result in oil being discharged through the air filter on top of the hydraulic tank.*

4. Start the tractor and run it for 2 minutes and then turn it off.
5. Again check the oil level in the sight gauge. If the oil level is in the sight gauge, the unit is ready to run. If no oil is seen, add oil to bring the level up to the sight gauge.
6. Repeat steps 4 and 5 as required until the oil level stabilizes at the level of the sight gauge.

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Proper Torque for Fasteners

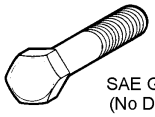
The chart lists the correct tightening torque for fasteners. When bolts are to be tightened or replaced, refer to this chart to determine the grade of bolts and the proper torque except when specific torque values are assigned in manual text.

RECOMMENDED TORQUE IN FOOT POUNDS UNLESS OTHERWISE STATED IN THE MANUAL*

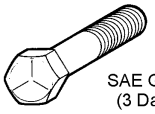
NOTE: These values apply to fasteners as received from supplier, dry or when lubricated with normal engine oil. They do not apply if special graphited or molydisulphide greases or other extreme pressure lubricants are used. This applies to both UNF fine and UNC coarse threads.

TORQUE SPECIFICATIONS

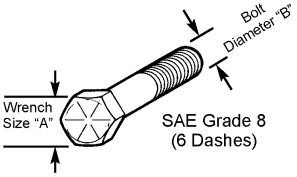
AMERICAN
Bolt Head Markings



SAE Grade 2
(No Dashes)



SAE Grade 5
(3 Dashes)

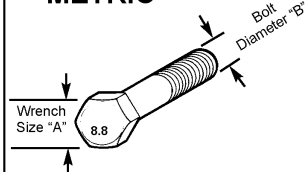


SAE Grade 8
(6 Dashes)

Proper torque for American fasteners.
Recommended Torque in Foot Pounds (Newton Meters).*

WRENCH SIZE (IN.) "A"	BOLT DIAMETER (IN.) "B" AND THREAD SIZE	SAE GRADE 2	SAE GRADE 5	SAE GRADE 8
7/16	1/4 - 2O UNC	6 (7)	8 (11)	12 (16)
7/16	1/4 - 28 UNF	6 (8)	10 (13)	14 (18)
1/2	5/16 - 18 UNC	11 (15)	17 (23)	25 (33)
1/2	5/16 - 24 UNF	13 (17)	19 (26)	27 (37)
9/16	3/8 - 16 UNC	20 (27)	31 (42)	44 (60)
9/16	3/8 - 24 UNF	23 (31)	35 (47)	49 (66)
5/8	7/16 - 14 UNC	32 (43)	49 (66)	70 (95)
5/8	7/16 - 20 UNF	36 (49)	55 (75)	78 (106)
3/4	1/2 - 13 UNC	49 (66)	76 (103)	106 (144)
3/4	1/2 - 20 UNF	55 (75)	85 (115)	120 (163)
7/8	9/16 - 12 UNC	70 (95)	109 (148)	153 (207)
7/8	9/16 - 18 UNF	79 (107)	122 (165)	172 (233)
15/16	5/8 - 11 UNC	97 (131)	150 (203)	212 (287)
15/16	5/8 - 18 UNF	110 (149)	170 (230)	240 (325)
1-1/8	3/4 - 10 UNC	144 (195)	266 (360)	376 (509)
1-1/8	3/4 - 16 UNF	192 (260)	297 (402)	420 (569)
1-5/16	7/8 - 9 UNC	166 (225)	430 (583)	606 (821)
1-5/16	7/8 - 14 UNF	184 (249)	474 (642)	668 (905)
1-1/2	1 - 8 UNC	250 (339)	644 (873)	909 (1232)
1-1/2	1 - 12 UNF	274 (371)	705 (955)	995 (1348)
1-1/2	1 - 14 UNF	280 (379)	721 (977)	1019 (1381)
1-11/16	1-1/8 - 7 UNC	354 (480)	795 (1077)	1288(1745)
1-11/16	1-1/8 - 12 UNF	397 (538)	890 (1206)	1444 (1957)
1-7/8	1-1/4 - 7 UNC	500 (678)	1120 (1518)	1817 (2462)
1-7/8	1-1/4 - 12 UNF	553 (749)	1241 (1682)	2013 (2728)
2-1/16	1-3/8 - 6 UNC	655 (887)	1470 (1992)	2382 (3228)
2-1/16	1-3/8 - 12 UNF	746 (1011)	1672 (2266)	2712 (3675)
2-1/4	1-1/2 - 6 UNC	870 (1179)	1950 (2642)	3161 (4283)
2-1/4	1-1/2 - 12 UNF	979 (1327)	2194 (2973)	3557 (4820)

METRIC



Numbers appearing on bolt heads indicate ASTM class.

*Use 75% of the specified torque value for plated fasteners. Use 85% of the specified torque values for lubricated fasteners.

Proper torque for Metric fasteners.
Recommended torque in Foot Pounds (Newton Meters).*

WRENCH SIZE (mm) "A"	BOLT DIA. (mm) "B"	ASTM 4.6	ASTM 8.8	ASTM 9.8	ASTM 10.9
8	5	1.8 (2.4)		5.1 (6.9)	6.5 (8.8)
10	6	3 (4)		8.7 (12)	11.1 (15)
13	8	7.3 (10)		21.1 (29)	27 (37)
16	10	14.5 (20)		42 (57)	53 (72)
18	12	25 (34)	74 (100)	73 (99)	93 (126)
21	14	40 (54)	118 (160)	116 (157)	148 (201)
24	16	62 (84)	167 (226)	181 (245)	230 (312)
30	20	122 (165)	325 (440)		449 (608)
33	22		443 (600)		611 (828)
36	24	211 (286)	563 (763)		778 (1054)
41	27		821 (1112)		1138 (1542)
46	30	418 (566)	1119 (1516)		1547 (2096)

Mnt-B-0005

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ALAMO-INDUSTRIAL

LIMITED WARRANTY

1. LIMITED WARRANTIES

1.01. Alamo Industrial warrants for one year from the purchase date to the original non-commercial, governmental, or municipal purchaser ("Purchaser") and warrants for six months to the original commercial or industrial purchaser

1.02. Manufacturer will replace for the Purchaser any part or parts found, upon examination at one of its factories, to be defective under normal use and service due to defects in material or workmanship.

1.03. This limited warranty does not apply to any part of the goods which has been subjected to improper or abnormal use, negligence, alteration, modification, or accident, damaged due to lack of maintenance or use of wrong fuel, oil, or lubricants, or which has served its normal life. This limited warranty does not apply to any part of any internal combustion engine, or expendable items such as blades, shields, guards, or pneumatic tires except as specifically found

1.04. Except as provided herein, no employee, agent, Dealer, or other person is authorized to give any warranties of any nature on behalf of Manufacturer.

2. REMEDIES AND PROCEDURES.

2.01. This limited warranty is not effective unless the Purchaser returns the Registration and Warranty Form to Manufacturer within 30 days of purchase.

2.02. Purchaser claims must be made in writing to the Authorized Dealer ("Dealer") from whom Purchaser purchased the goods or an approved Authorized Dealer ("Dealer") within 30 days after Purchaser learns of the facts on which the claim is based.

2.03. Purchaser is responsible for returning the goods in question to the Dealer.

2.04. If after examining the goods and/or parts in question, Manufacturer finds them to be defective under normal use and service due to defects in material or workmanship, Manufacturer will:

(a)Repair or replace the defective goods or part(s) or

(b)Reimburse Purchaser for the cost of the part(s) and reasonable labor charges (as determined by Manufacturer) if Purchaser paid for the repair and/or replacement prior to the final determination of applicability of the warranty by Manufacturer.

The choice of remedy shall belong to Manufacturer.

2.05. Purchaser is responsible for any labor charges exceeding a reasonable amount as determined by Manufacturer and for returning the goods to the Dealer, whether or not the claim is approved. Purchaser is responsible for the transportation cost for the goods or part(s) from the Dealer to the designated factory.

3. LIMITATION OF LIABILITY.

3.01. MANUFACTURER DISCLAIMS ANY EXPRESS (EXCEPT AS SET FORTH HEREIN) AND IMPLIED WARRANTIES WITH RESPECT TO THE GOODS INCLUDING, BUT NOT LIMITED TO, MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE.

3.02. MANUFACTURER MAKES NO WARRANTY AS TO THE DESIGN, CAPABILITY, CAPACITY, OR SUITABILITY FOR USE OF THE GOODS.

3.03. EXCEPT AS PROVIDED HEREIN, MANUFACTURER SHALL HAVE NO LIABILITY OR RESPONSIBILITY TO PURCHASER OR ANY OTHER PERSON OR ENTITY WITH RESPECT TO ANY LIABILITY, LOSS, OR DAMAGE CAUSED OR ALLEGED TO BE CAUSED DIRECTLY OR INDIRECTLY BY THE GOODS INCLUDING, BUT NOT LIMITED TO, ANY INDIRECT, SPECIAL, CONSEQUENTIAL, OR INCIDENTAL DAMAGES RESULTING FROM THE USE OR OPERATION OF THE GOODS OR ANY BREACH OF THIS WARRANTY. NOT WITHSTANDING THE ABOVE LIMITATIONS AND WARRANTIES, MANUFACTURER'S LIABILITY HEREUNDER FOR DAMAGES INCURRED BY PURCHASER OR OTHERS SHALL NOT EXCEED THE PRICE OF THE GOODS.

3.04. NO ACTION ARISING OUT OF ANY CLAIMED BREACH OF THIS WARRANTY OR TRANSACTIONS UNDER THIS WARRANTY MAY BE BROUGHT MORE THAN TWO (2) YEARS AFTER THE CAUSE OF ACTION HAS OCCURRED.

4. MISCELLANEOUS.

4.01. Proper Venue for any lawsuits arising from or related to this limited warranty shall be only in Guadalupe County, Texas.

4.02. Manufacturer may waive compliance with any of the terms of this limited warranty, but no waiver of any terms shall be deemed to be a waiver of any other term.

4.03. If any provision of this limited warranty shall violate any applicable law and is held to be unenforceable, then the invalidity of such provision shall not invalidate any other provisions herein.

4.04. Applicable law may provide rights and benefits to purchaser in addition to those provided herein.

KEEP FOR YOUR RECORDS

ATTENTION: Purchaser should fill in the blanks below for his reference when buying repair parts and/or for proper machine identification when applying for warranty.

Servis-Rhino Implement Model _____ Serial Number _____

Date Purchased _____ Dealer _____

ATTENTION: _____

READ YOUR OPERATOR'S MANUAL

ALAMO INDUSTRIAL
An Alamo Group Company
Post Office Drawer 549
Seguin, Texas 78156
830-379-1480

BC-0002

BC-0002

TO THE OWNER/OPERATOR/DEALER

To keep your implement running efficiently and safely, read your manual thoroughly and follow these directions and the Safety Messages in this Manual. The Table of Contents clearly identifies each section where you can easily find the information you need.

The OCCUPATIONAL SAFETY AND HEALTH ACT (1928.51 Subpart C) makes these minimum safety requirements of tractor operators:

REQUIRED OF THE OWNER:

1. Provide a Roll-Over-Protective Structure that meets the requirements of this Standard; and
2. Provide Seat belts that meet the requirements of this paragraph of this Standard and SAE J4C; and
3. Ensure that each employee uses such Seat belt while the tractor is moving; and
4. Ensure that each employee tightens the Seat belt sufficiently to confine the employee to the protected area provided by the ROPS.

REQUIRED OF THE OPERATOR

1. Securely fasten seat belt if the tractor has a ROPS.
2. Where possible, avoid operating the tractor near ditches, embankments, and holes.
3. Reduce speed when turning, crossing slopes, and on rough, slick, or muddy surfaces.
4. Stay off slopes too steep for safe operation.
5. Watch where you are going - especially at row ends, on roads, and around trees.
6. Do not permit others to ride.
7. Operate the tractor smoothly - no jerky turns, starts, or stops.
8. Hitch only to the drawbar and hitch points recommended by the tractor manufacturer.
9. When the tractor is stopped, set brakes securely and use park lock, if available.

Keep children away from danger all day, every day...

Equip tractors with rollover protection (ROPS) and keep all machinery guards in place...

Please work, drive, play and live each day with care and concern for your safety and that of your family and fellow citizens.

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